U.S. Department of Transportation

United States Coast Guard

AVIATION LIFE SUPPORT SYSTEMS MANUAL

SO OTHERS MAY LIVE

COMDTINST M13520.1B **10 JUL 2000**

U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

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COMMANDANT INSTRUCTION M13520.1B

Subj: AVIATION LIFE SUPPORT SYSTEMS MANUAL

1. PURPOSE. This letter promulgates the new issue of the Aviation Life Support Systems Manual, COMDTINST M13520.1B. The Manual prescribes policy, guidance and technical information related to the configuration, inspection and maintenance of all Coast Guard aviation life support equipment. Policies and procedures are outlined for the Aeronautical Engineering community.

2. ACTION. Area and district commanders, commanders of maintenance and logistics commands, commanding officers of headquarters units, assistant commandants for directorates, Chief Counsel, and special staff offices at Headquarters shall ensure that the provisions of this Manual are followed. No paper distribution will be made of this Manual. Official distribution will be via the Coast Guard Directives System CD-ROM. An electronic version will also be made available via the Commandant (G-SEA) and the Aircraft Repair and Supply Center (ARSC) websites.

3. DIRECTIVES AFFECTED. Aviation Life Support Systems Manual, COMDTINST M13520.1A is cancelled.

4. DISCUSSION. This Manual supersedes Aviation Life Support Systems Manual, COMDTINST M13520.1A dated 01 June 1994 in its entirety. This version primarily reflects changes in the format of the Manual, as well as the removal of obsolete equipment information. Due to the significant revision of this Manual, a thorough reading is required.

5. RECOMMENDATIONS. Recommendations for changes/improvements to this Manual shall be submitted via the chain of command to Commandant (G-SEA), using a CG-22, the Aeronautical Publication Change Recommendation form. This Manual will be reviewed on a regular basis.

// signed //
R. F. SILVA

DISTRIBUTION – SDL No. 138

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NON-STANDARD DISTRIBUTION: See Action paragraph.

Assistant Commandant for Systems

RECORD OF CHANGES

CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	BY WHOM ENTERED

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Section A. Aviation Life Support Equipment (ALSE) Introduction

A.1. ALSE Deviation and Modification Authority Policy

Deviations from equipment configurations are unauthorized. Deviations and peculiar configurations or modifications of the equipment by individual aircrew members are not authorized, and the Aviation Survival Technician has no authority or responsibility to perform them. Recommendations for equipment configuration changes, deletions, or replacements shall be submitted for investigation and action directly to ARSC ALSE System Manager or individually via the applicable chain of command.

A.2. ALSE Organization

Aviation Life Support Equipment (ALSE) is an essential element in the Coast Guard mission support structure. The following is a condensed description of the ALSE management structure.

- Commandant (G-OCA): Is the Rescue Swimmer Program Manager and Aviation Life Support Requirements Manager. As such, G-OCA sets the operational requirements for ALSE.

- ARSC ALSE Engineering: Is the Aviation Life Support System Manager. As such, ARSC acts as the project manager for new ALSE acquisitions, and manages in-service ALSE.

- ALSE Prime Unit: Is responsible for technical responsiveness to field level ALSE maintenance managers. As such, ALSE Prime Unit is the first point of contact for field level ALSE maintenance manager's technical inquiries.

A detailed description of the structure of the ALSE organization is located in Aeronautical Engineering Maintenance Management Manual, COMDTINST M13020.1 (series).

A.3. Manual Release Authority

This Aviation Life Support Systems Manual is prepared and released under the authority of the Commandant, United States Coast Guard.

Continued next page

A.4. Purpose of COMDTINST M13520.1 (series)

The purpose of Aviation Life Support Equipment Systems Manual, COMDTINST M13520.1 (series) is to furnish its users with an up-to-date, single source of technical information concerning Aviation Life Support Systems and Rescue Equipment in use by Coast Guard Aviation. Life Support and Rescue Equipment, as referred to herein, is defined as survival, protective, emergency, and rescue devices employed for use by Coast Guard Aviation.

A.5. Contents of COMDTINST M13520.1 (series)

The Aviation Life Support Equipment Systems Manual, COMDTINST M13520.1 (series) contains policies, guidance, instructions, technical data, illustrations, procedures, and descriptions pertinent to configuration, modification, application, and use of Coast Guard Aviation Life Support Systems and Rescue Equipment. All relevant data formerly contained in Coast Guard, Air Force, and Navy publications have been assimilated by the Coast Guard Aviation Life Support Systems Manual. Only ARSC ALSE System Manager and Prime Units shall maintain the NAVAIR 13-1-6 (Aviation Crew System) series manuals. Commandant (G-SEA) will formulate, produce, and distribute applicable equipment change action to the equipment and to respective sections of the Aviation Life Support Systems Manual.

A.6. Updating COMDTINST M13520.1 (series)

The Aviation Life Support Equipment Systems Manual, COMDTINST M13520.1 (series) will be updated periodically by issuance of a list of effective pages including all original, revised, added, and deleted pages inserted in the front of each volume immediately following the title page. Revised and added pages, appropriately dated, will be issued with the index and inserted into this volume according to page numbers. The replaced and/or deleted pages and superseded list of effective pages shall be discarded. All directives (Commandant Instructions, Coast Guard Technical Orders, etc.) issued after the date of latest index shall be complied with. These directives will be incorporated in the next change/revision of this manual.

A.7. Recent Developments

This manual reflects major changes recently initiated in the area of Life Support equipment. Changes such as forms, testing procedures, equipment configuration, reporting procedures, inspection intervals, and general information are included in applicable chapters.

Continued next page

A.8. Comments and Recommendations

Comments concerning this manual may be submitted via CG-22, Aeronautical Publication Change Recommendation Form. All personnel are encouraged to use this form as necessary.

A.9. Supplementary Publications

All AST shops shall maintain a library of applicable publications associated with the equipment their shop maintains. The following publications supplement this manual and the Life Support Systems Facility:

- Technical Information Management and Ordering System (TIMOS)
- Directives, Publications and Report Index (DPRI), COMDTNOTE 5600
- Aeronautical Engineering Maintenance Management Manual, COMDTINST M13020.1 (series)
- Coast Guard Air Operations Manual, COMDTINST M3710.1 (series)
- Coast Guard Helicopter Rescue Swimmer Operations Manual, COMDTINST M3710.4 (series)
- Coast Guard Rescue and Survival Systems Manual, COMDTINST M10470.10 (series)
- Coast Guard Mandatory Special Requirement (MSR) Cards
- Poynter Parachute Manual
- Ordnance Publication Index, COMDTINST M8000.3 (series)
- Ordnance Manual, COMDTINST M8000.2 (series)
- Pyrotechnics, Screening, Marking and Countermeasures Devices, NASEA SW050-AB-MMA-010 (Volume 1)
- Applicable Aircraft Manuals
- Prevention of Bloodborne Pathogen Transmission, COMDTINST M6220.8 (series)

Section B. USCG ALSE Policies and Procedures

B.1. Special Policy Note

NOTE

Normally only graduates of Aviation Survival Technician School are authorized to inspect, maintain, and modify rescue and survival equipment. During an extended deployment, air station engineering officers may authorize a primary QA to perform visual and post-usage inspections to ALSE (excluding inflatables and parachutes).

B.2. Mandatory Special Requirements (MSR)

Mandatory Special Requirements (MSR) Cards have precedence over all other maintenance and inspection procedures.

B.3. MSR Life Support Equipment Extensions

No extensions are authorized at the unit level on life support equipment. Under special circumstances extensions may be authorized by ARSC (ALSE System Manager is point-of-contact).

B.4. General ALSE Polices and Procedures

Polices and procedures for use of Aviation Life Support Systems and Rescue Equipment in Coast Guard aircraft are contained in the Coast Guard Air Operations Manual, COMDTINST M3710.1 (series). Those policies pertaining to all other aspects of the systems and equipment are listed as follows:

WARNING

Applicable Material Safety Data Sheet(s) (MSDS) shall be reviewed prior to performing any maintenance requiring the use of hazardous materials.

a. Inflatable Survival Equipment. Aviation units shall maintain a sufficient quantity of inflatable equipment to meet the requirements of Coast Guard Air Operations Manual, COMDTINST M3710.1 (series). Coast Guard inflatable equipment shall be maintained, configured, and tested in accordance with Chapter 2 of this manual. The issuance of inflatable equipment shall be in accordance with Coast Guard Air Operations Manual, COMDTINST M3710.1 (series).

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B.4. General ALSE Polices and Procedures (Continued)

b. Parachutes. Aviation units shall maintain sufficient quantity of the specified type parachutes needed to meet the requirements of Coast Guard Air Operations Manual, COMDTINST M3710.1 (series).

c. Survival Items and Kits. Aviation units shall maintain a sufficient quantity and type of survival items and kits to meet the requirements of Coast Guard Air Operations Manual, COMDTINST M3710.1 (series). Survival items and kits shall be maintained in accordance with the guidelines and principles stated in Chapter 4 of this manual.

d. Oxygen Equipment. Oxygen equipment shall be maintained in accordance with instructions stated in Chapter 5 of this manual. Applicable aircraft maintenance manuals and parts/item identification manuals shall be used for direct oxygen equipment maintenance of aircraft installed items. Shop and storage conditions will comply with the minimum environmental shop conditions described in Chapters 2, 3, and 5 of this manual as they pertain to the survival equipment shop and the parachute loft and storage areas.

e. Rescue Equipment. Rescue equipment shall be maintained and tested in accordance with Chapter 6 of this manual.

f. Protective Equipment. All aircrew members shall be permanently issued the minimum flight clothing and equipment as described in the Coast Guard Air Operations Manual, COMDTINST M3710.1 (series). All flight clothing and equipment issues and returns will be documented on Form CG-538. See enclosure 1.

g. Supplemental and Auxiliary Equipment. Commanding officers are encouraged to supplement this equipment as necessary to fit the needs of the unit regarding mission environment, operational type and range. The use of winter flight clothing in northern climates is mandatory during winter months. Protective clothing and auxiliary survival equipment appropriate for aircrew operating in northern or tropical climates shall be provided and issued as applicable for safe mission completion. All protective equipment shall be issued, configured, and maintained in accordance with Chapters 4 and 7 of this manual.

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B.4. General ALSE Polices and Procedures (Continued)

h. Cartridges and Cartridge-Activated Devices, Pyrotechnics and Ordnance Equipment. Cartridges and cartridge-activated devices shall be maintained in accordance with appropriate DOD manuals listed in the Ordnance Publications Index COMDTNOTE 8000. 3 (series). Pyrotechnic ordnance and ordnance equipment shall be maintained in accordance with Ordnance Manual, COMDTINST M8000.2 (series).

i. Emergency Communication Equipment. All emergency transceivers/transmitters shall be procured and maintained in accordance with Chapter 4 of this manual.

j. Allocation. Aircraft type, mission to be accomplished, number of aircrew members/passengers aboard, and geographical flying environment/range determine allocation of Life Support Equipment. A specific spare allocation is necessary for crewmembers and passengers, assemblies down for rework, for lead time replacement items, and repack/overhaul cycle spares.

k. Procurement Data. The Aviation Life Support Information and Procurement Sheet (ALSIPS) and the AST Authorized Chemical List (ACL) will be used to obtain procurement information for all components of life support equipment or personally issued gear. The ALSIPS and ACL will be maintained in the MSR card deck. In certain situations, at Commanding Officers' discretion and when authorized by ARSC ALSE System Manager, it may be necessary to procure survival equipment commercially to augment the ALSIPS.

l. Quality Assurance. The most critical periods for assuring the performance of Rescue and Survival Equipment are the Acceptance/Calendar/Condition inspections, repairing, and the re-packing of the assemblies. Therefore, quality assurance steps are underlined or noted, as **QA REQUIRED AT THIS POINT**. The Aviation Survival Technician shall perform the step and then have the performance verified by supervising personnel. QA's shall be designated in writing by the Engineering Officer IAW Aeronautical Engineering Maintenance Management Manual, COMDTINST M13020.1 (series). Supervisors are primarily responsible for quality assurance, and they may delegate experienced QA designated personnel in the survival shop to perform these inspections.

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Section A. Inflatable Equipment Overview

A.1. Introduction

This chapter covers all applicable information relating to inflatable survival equipment. It is sectioned to reflect the different functions and equipment data covered in this chapter.

A.2. Quality Assurance

CAUTION

In no case shall the Aviation Survival Technician perform their own quality assurance inspections.

The procedures detailed present a logical sequence for proper maintenance. Quality assurance steps are provided for critical operations. When a step is followed by **QA REQUIRED**, the Aviation Survival Technician shall perform the step and then have the authorized QA inspector perform the inspection.

A.3. Records

All inflatable survival equipment shall be subjected to periodic inspections and maintenance. These tasks are the primary assurance of survival equipment functioning properly and no instance of carelessness or willful neglect shall be allowed to pass unnoticed. Mandatory Special Requirements (MSR) are used by the Aviation Survival Technician to provide a systematic means of control. The MSR Maintenance Procedure Cards (MPC) provide a logical sequence for inspection and maintenance of equipment. Additionally, they provide a REMARKS section to denote any maintenance performed on equipment.

NOTE

The REMARKS section shall be used when any discrepancy is found and corrected if repairable. The information provided in this section is critical in determining equipment reliability, failure trends, and maintenance intervals.

Section B. Inflatable Maintenance Areas

B.1. General Inflatable Maintenance Areas Requirements

The survival shop is generally the area for inspection and maintenance for inflatable equipment. However, since the area must also be used to support many other Life Support System collateral functions, the details of equipment condition, plant property, environmental control, and cleanliness are of extreme importance. Wherever inflatable maintenance is performed, the following facility requirements shall be met.

- The survival shop/inflatables inspection and maintenance area shall be large enough to service the largest inflatable item as well as the greatest number of inflatable items per set that will be inspected/maintained during any one phased interval inspection.

- Inflatable packing and inspection tables shall be large enough to accommodate the entire set being tested and permit a maintenance work area for each unit.

- The table shall be smooth surfaced and totally free of sharp edges, points, burrs, or slivers.

- Decks where rafts are serviced, tested, and maintained shall be covered with linoleum, asphalt tile, polished terrazo stone, tile, or a similar smooth, padded (rubber), clean surface.

CAUTION

Do not inspect or maintain inflatable survival equipment on carpet, asphalt, concrete decks, hardwood or similar wood decks where nails, splinters, lime, grit, or pebbles may damage the inflatable items. Decks must be thoroughly cleaned prior to performing any maintenance or testing procedures.

B.2. Environmental Conditions

The following environmental conditions shall be met to ensure proper conditions for curing adhesives, applying retro-reflective surfaces, stenciling, cleaning, and maintaining all inflatable equipment.

a. Lighting. All lighting shall be recessed or shrouded fluorescent lighting. Windows shall be fitted with protective blinds or drapes to exclude extended sunlight exposure periods which degrade synthetics and poly-bonded fabrics.

Continued next page

B.2. Environmental Conditions (Continued)

b. Ventilation. Adequate ventilation shall be provided to prevent accumulation of fumes or gases from solvents, adhesives, CO_2 and any other substance that may pose a risk to environmental safety.

c. Temperature and Humidity Control. The temperature and humidity ranges shall be maintained between 65 °F and 75 °F and 40%-60% humidity. The ideal method of controlling temperature and humidity is an air conditioning system. To obtain maximum effectiveness, a check of physical conditions shall be made in survival/inflatables shop. A notation shall be made several times each day of the temperature and humidity levels when inflatables are being tested, maintained, modified, or inspected.

B.3. Shop Air Requirements

Shop air will be regulated, no higher than 40 PSIG air from a source that is filtered to ensure no oil or moisture is present.

Section C. Life Raft Maintenance

C.1. Types of Maintenance

Maintenance of life rafts consists of the following:

- Calendar Inspections
- Special Inspections
- Cleaning of life rafts
- Cleaning of containers and/or cases
- Fabrication of inspection streamers

C.2. Calendar Inspections

All life rafts will be inspected on a calendar basis in accordance with the appropriate MSR MPC, not to exceed 180 days. Inspection intervals can be found in this manual under the appropriate life raft section. Three types of calendar inspections will be performed: the acceptance, the leak test, and the functional test.

C.3. Special Inspections

A special inspection of life rafts in storage or in service will be performed whenever conditions warrant. The AST shop supervisor, following review of the circumstances or conditions to which the life raft has been subjected, will determine the extent of the special inspection. If another inspection is warranted the AST shop supervisor will direct the appropriate inspection, regardless of the last inspection date.

C.4. Cleaning of Life Rafts

To clean life rafts, proceed as follows:

Materials Required:
- Detergent General Purpose MIL-D-16791 (or commercial equivalent)
- Lint Free Cloth
- Talcum Powder, MIL-T-50036
- Soft brush, rag, or sponge

Continued next page

C.4. Cleaning of Life Rafts (Continued)

CAUTION

Solvents are not to be used in the cleaning of inflatable equipment.

Step	Action
1	Prepare a solution of cleaning compound consisting of one part compound to three parts water.
2	Apply cleaning solution to soiled area with a spray or swab.
3	Allow solution to remain on the surface for several minutes, then agitate with soft brush or rag.
4	Rinse the surface thoroughly with water, wipe with a cloth or sponge. Repeat this application until surface is free from all solution.
5	Dry raft with lint-free cloth, and apply a light coat of talcum powder.

C.5. Cleaning Containers and/or Cases

Containers and/or cases shall be cleaned in accordance with section C. 4.

C.6. Inspection Streamers

The following inspection streamers are necessary to complete an inspection on the F-2B and/or the LRU-20/A life rafts:

- **TIE TO AIRCRAFT**
- **VENT CLOSED** (F-2B with manifold P/N 9153 installed)
- **PUSH IN TO VENT** (F-2B with manifold P/N C-50980 installed)
- **REMOVE BEFORE PACKING** (equalizer tube clamp or inflation hose plug)

Continued next page

C.6. a. Red Streamer Fabrication

To fabricate inspection streamers use the instructions in the following tables.

Step	Action
1	Cut a 36-inch piece of red Type IV cotton webbing.
2	Fold either bitter end back ½inch onto the standing part.
3	Bar tack the fold in place using E thread at 6 to 8 stitches per inch.
4	Repeat steps 2 and 3 for other bitter end.
5	Using a #1 grommet punch, punch a hole through the webbing on either end.
6	Install a #1 grommet in the hole.

C.6. b. Tie to Aircraft Streamer Fabrication

To fabricate a TIE TO AIRCRAFT streamer use the instructions in the following table.

Step	Action
1	Fabricate a streamer in accordance with Section C. 6. a.
2	Stencil TIE TO AIRCRAFT on the red streamer using black one-inch letters.

Continued next page

C.6. c. Vent Closed Streamer Fabrication

To fabricate a VENT CLOSED streamer use the instructions in the following table.

Step	Action
1	Fabricate a streamer in accordance with Section C. 6. a.
2	Cut and sear a 36-inch piece of Type 1 nylon cord.
3	Tie one bitter end of the Type 1 nylon cord to the grommet on the red streamer using a bowline knot.
4	Tie the other bitter end to a Pull Test Adapter P/N 9141 using a bowline knot.
5	Stencil VENT CLOSED on the red streamer using black one-inch letters.

C.6. d. Push In to Vent Streamer Fabrication

To fabricate a PUSH IN TO VENT streamer use the instructions in the following table.

Step	Action
1	Fabricate a streamer in accordance with Section C. 6. a.
2	Cut and sear a 36-inch piece of Type 1 nylon cord.
3	Tie one bitter end of the Type 1 nylon cord to the grommet on the red streamer using a bowline knot.
4	Stencil PUSH IN TO VENT on the red streamer using black one-inch letters.

Continued next page

C.6. e. Remove Before Packing Streamer Fabrication

To fabricate a REMOVE BEFORE PACKING streamer use the instructions in the following table.

Step	Action
1	Fabricate a streamer in accordance with Section C. 6. a.
2	Cut and sear a 36-inch piece of Type 1 nylon cord.
3	Tie one bitter end of the Type 1 nylon cord to the grommet on the red streamer using a bowline knot.
4	Tie the other end to an equalizer tube clamp (F-2B application) or an inflation hose plug (LRU-20/A application) using a bowline knot.
5	Stencil REMOVE BEFORE PACKING on the red streamer using black one-inch letters.

Section D. Life Raft Repairs

D.1. Life Raft Repairs Overview

This section contains instructions for the repair of various components or sub-assemblies of life rafts to ensure that appropriate items of equipment remain in ready for issue status. Reference numbers for replacement parts, which are defective and require replacement, can be found on the ALSIPS. Reference numbers for chemicals, which are needed to effect repairs, can be found on the AST Authorized Chemical List (ACL). All repairs shall be documented on the appropriate MSR MPC.

D.2. Determination of Repairability

Life rafts shall be considered beyond unit level repair for any of the following reasons:

- Porous fabric areas on tubes that cause a leak test failure.
- Open seams or seam tape separation that causes a leak test failure.
- Damaged, malfunctioning, excessively worn, or corroded inlet valve, manifold, oral inflation valve, or oral inflation tube, as applicable. (LRU-15/A manifolds may be repaired or replaced.)
- Damaged, malfunctioning, excessively worn, or corroded topping-off valves that cannot be corrected by replacement of topping-off valve opening insert.
- Holes or tears larger than 1-inch.
- Holes or tears within 1-inch of seams.
- Holes or tears on non-inflatable floors larger than 7-inches.
- Internal bulkhead leakage.

D.3. Non-Repairable/Drill Life Rafts

If inspection indicates damage, which is beyond capabilities of unit level maintenance, the assembly shall be tagged Condition Code F (NRFI) and returned to ARSC. All ARSC (approved) condemned rafts and containers utilized for water survival training purposes shall be marked in a contrasting color, DRILL ONLY in 4-inch letters on raft floor, buoyancy tubes, and containers.

Continued next page

D.4. Cementing Life Rafts

All cementing of life rafts shall be performed as follows:

Materials Required:
- Wooden or Rubber Roller
- Soft Bristle Brush
- Toluene Technical MIL-TT-T-548
- Adhesive EC-2141
- Talcum Powder MIL-T-50036

WARNING

Do not use toluene near open flame, heat, or electrical sparks. Avoid prolonged contact with skin or breathing of fumes. Use only in well-ventilated area.

Step	Action
1	Clean both surfaces to be cemented with four applications of toluene. Apply toluene with back-and-forth strokes on the first and third applications, and one way perpendicular strokes on the second and fourth applications. Allow areas to dry between applications.
2	Using a disposable brush, apply cement to completely cover surfaces to be cemented. Use long one-directional strokes and complete each surface before cement becomes tacky as the brush may pull away the tacky cement from the surface. Allow to dry for 10 minutes.
3	Apply second coat of cement as in previous step. Use brush strokes perpendicular to the original direction.
4	When second coat of cement has become tacky, place pieces together. If cement area is a cut or tear, butt edges of damage together before applying patch. Roll out bubbles with a roller.
5	Allow cement to cure a minimum of 48 hours.
6	Lightly dust area with talcum powder.
7	Perform a leakage test IAW the applicable MSR MPC.

Continued next page

D.5. Patching Life Rafts

To patch inflatable survival equipment, select color to approximately match item to be patched and proceed as follows:

Materials Required: - Cloth Laminated Var. D (patching material)

Step	Action
1	Cut a rounded patch 1-inch larger than the damage on all sides.
2	If damaged area in floor is larger than 1-inch, patches shall be applied to both sides and edges of patches will be scalloped.
3	Center patch over damaged area and trace an outline of the patch on the fabric using a lead pencil.
4	Cement patch to damaged area in accordance with section D.4.
5	Perform a leakage test IAW the applicable MSR MPC.

Continued next page

D.6. Re-cementing or Replacing Seam Tapes

To re-cement or replace seam tape, proceed as follows:

Materials Required:
- Tape Coated Cloth Var. T, 1 ¼-inch width
- Toluene Technical MIL-TT-T-548
- Primer EC-2141
- Talcum Powder MIL-T-50036.

CAUTION

This repair shall be performed only if the flotation tube does not leak. Seam separations in floors and seats may be repaired provided safety and flotation capabilities are not compromised. Avoid excessive application of toluene on seams. Remove any spills or excess toluene immediately.

The table below provides repair procedures for three different seam tape discrepancies. After any repair to seam tapes, a leak test must be performed IAW the applicable MSR MPC.

If the...	then…
tape is present and undamaged,	re-cement tape to raft in accordance with section D.4.
tape is missing,	measure and fit a replacement tape to the area, overlap seams a minimum of 1-inch. Cement tape in place IAW section D.4.
tape is damaged,	peel damaged tape from raft. Apply toluene only as needed to loosen tape. Trim damaged tape and replace with new tape, overlapping seams a minimum of 1-inch. Cement tape in place IAW section D.4.

Continued next page

D.7. Replacement of Topping Off Valve Opening Insert

To replace a topping off valve opening insert, proceed as follows:

Step	Action
1	Back out the set-screw from the defective topping off valve.
2	Remove the defective topping off valve opening insert.
3	Install new topping off valve opening insert.
4	Reset the set screw, and tighten until snug.
5	Ensure proper operation of the topping off valve.
6	Perform leakage test IAW the applicable MSR MPC.

D.8. Replacement of a CO_2 Inflation Assembly and Gaskets

To replace a CO_2 inflation assembly and gaskets (see figure 2-1), proceed as follows:

Materials Required:
- Applicable Inflation Assembly with new top and bottom gaskets
- Torque Wrench (capable of 0 to 20-inch) pounds

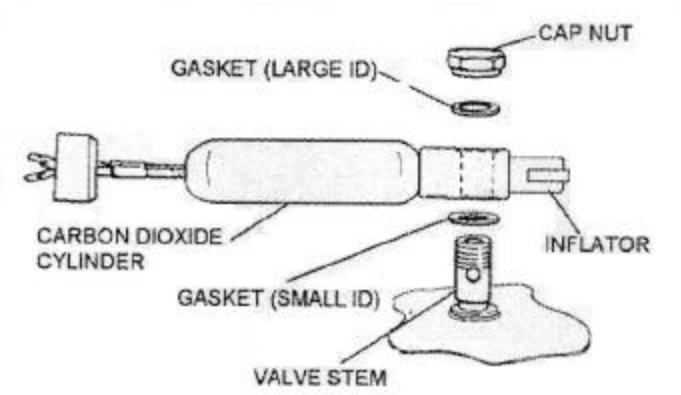

Figure 2-1 CO_2 Inflation Assembly

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D.8. Replacement of CO_2 Inflation Assembly and Gaskets (Continued)

The following is a continuation of the replace CO_2 inflation assembly and gaskets procedures.

Step	Action
1	Remove CO_2 cylinder from inflation assembly and retain for reinstallation.
2	Remove cap nut and top gasket from inflation assembly.
3	Remove old inflation assembly and bottom gasket.
4	Install new bottom gasket. **NOTE** The bottom gasket has a smaller inside diameter than the top gasket.
5	Install new inflation assembly and new top gasket; secure with cap nut. Tighten cap nut to a torque value of 8 +/- 1-inch pound.
6	Operate actuating lever three or four times to ensure that lever moves freely and that piercing pin moves freely inside valve body.
7	Perform functional test IAW applicable MSR MPC.

D.9. Replacing Gaskets on CO_2 Inflation Valve Assemblies

To replace gaskets on a CO_2 inflation assembly refer to Section D.8.

Continued next page

D.10. Repair of Corroded CO_2 Inflation Assemblies

To repair corroded inflation assemblies, proceed as follows:

Materials Required:
- Small wire brush
- Fluid Film NSN 8030-01-381-6357
- Lint free cloth

NOTE

The decision to repair or replace a corroded inflation assembly will be left up to the discretion of the shop supervisor. If the inflation assembly is to be replaced refer to section D.8., Replacement of a CO_2 Inflation Assembly and Gaskets.

Step	Action
1	Gain access to the corroded inflation assembly.
2	Remove CO_2 bottle from applicable inflation assembly.
3	**CAUTION** *Eye protection should be worn.* Using the small wire brush, gently remove the corrosion from inflation assembly.
4	Using shop air, blow the corrosion residue from the inflation assembly.
5	Apply a small amount of the fluid film over the entire inflation assembly.
6	Using a lint free cloth remove any excess fluid film.
7	Replace the CO_2 cylinder.
8	Perform functional test IAW applicable MSR MPC.

Continued next page

D.11. Replacement of Check Valve in CO_2 Inflation Valve Assembly

To replace check valves in a CO_2 inflation assembly, proceed as follows:

Materials Required:
- Check Valve Assembly
- Valve Core Tool P/N 318M0007P001 NSN 5410-00-308-3809
- Torque Wrench capable of 0 to 20-Inch Pounds

Step	Action
1	Remove CO_2 bottle from applicable inflation assembly.
2	Remove inflation assembly cap nut.
3	Insert valve core tool and unscrew check valve from valve stem.
4	Insert new check-valve in valve stem and tighten with valve core tool hand tight.
5	Replace cap-nut and tighten to a torque valve of 8 +/- 1-inch pound.
6	Perform functional test IAW applicable MSR MPC.

Continued next page

D.12. Replacement of Beaded Inflation Handle Assembly

To replace the beaded inflation handle, proceed as follows:

Step	Action
1	Remove CO_2 cylinder from inflation assembly.
2	Remove inflation lanyard from inflation assembly.
3	Pass the beaded handle's lanyard loop through the hole in the activation lever on the inflation assembly.
4	Form a Larks Head knot and pull tight.
5	Perform inflation handle pull test IAW the applicable MSR MPC.
6	Re-cock inflation assembly lever and install CO_2 cylinder.

D.13. CO_2 Cylinder Poppet Valve Inspection/ Replacement

To inspect and/or replace the LRU-15/A CO_2 Cylinder Poppet Valve (see figure 2-2), proceed as follows:

Materials Required:
- Washer, Sealing P/N A128-13, NIIN 00-159-2599 or Parts Kit, Valve P/N ASV 710 34009, NIIN 00-999-7662
- Valve Poppet Assembly P/N ASV-601, NIIN 00-507-6667
- Torque Wrench (capable of 0 to 250 ft-lbs.)

WARNING

Before performing any work on inflation valves, ensure that CO_2 inflation assembly is completely discharged.

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D.13. CO_2 Cylinder Poppet Valve Replacement (Continued)

The following is a continuation of the LRU-15/A CO_2 cylinder poppet valve, inspection/replacement procedures.

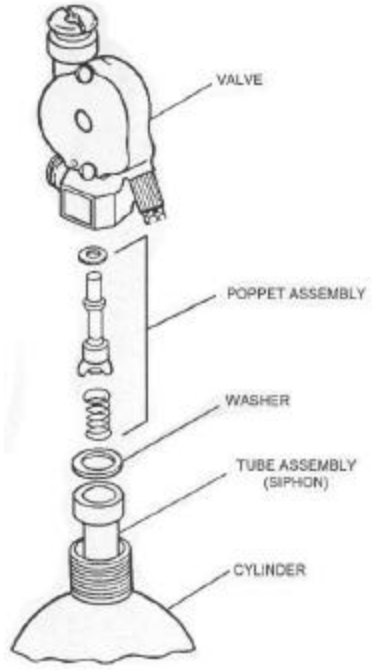

Figure 2-2 LRU-15/A CO_2 Cylinder Disassembly

Step	Action
1	Remove CO_2 cylinder from life raft.
2	Ensure CO_2 cylinder pressure has been bled off IAW chapter 2 section E.8.
3	Remove valve from CO_2 cylinder.
4	Disassemble valve and inspect poppet for worn seat. Replace poppet assembly if necessary.
5	Install a new sealing washer.
6	Thread inflation valve onto CO_2 cylinder and tighten to a torque value of 165 to 175 ft-lbs.
7	Service CO_2 cylinder IAW chapter 2 section E.10.

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D.14. CO_2 Cylinder Valve Safety Disk Replacement

To replace a LRU-15A CO_2 cylinder valve safety disk (see figure 2-3), proceed as follows:

Materials Required:
- Torque Wrench (capable of 0 to 50 ft-lbs.)
- Socket, 5/16-inch
- Repair Kit (Insert, Washer, Disc) P/N 903684, NIIN 00-703-7811
- Hex Stock, 5/16 x 12-inch Length

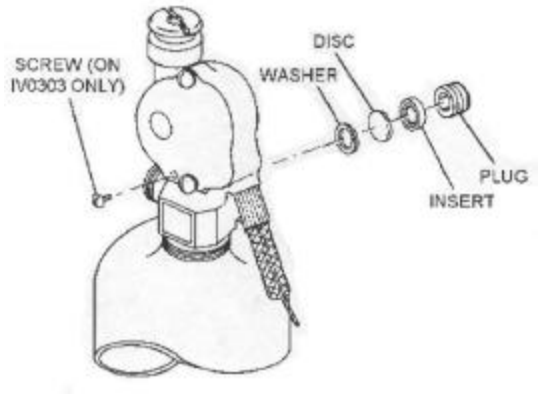

Figure 2-3 LRU-15A CO_2 Cylinder Safety Disk

WARNING

Before performing any work on inflation valves, ensure that CO_2 inflation assembly is completely discharged.

Step	Action
1	Remove cylinder from life raft.
2	Ensure CO_2 cylinder has been bled off IAW chapter 2, section E.8.
3	Remove old safety disc plug and washer.
4	Place new washer into inflation valve safety disc orifice.
5	Place new safety disc into inflation valve safety disc orifice.

Continued next page

D.14. CO_2 Cylinder Valve Safety Disk Replacement (Continued)

The following is a continuation of the LRU-15/A CO_2 cylinder valve safety disk replacement procedures.

Step	Action
6	Replace insert and safety disc plug. **NOTE** While tightening the safety disc plug, align insert with plug.
7	Tighten safety plug to 29 ft-lbs. of torque.
8	Service CO_2 cylinder IAW chapter 2, section E.10.

D.15. LRU-15/A Manifold Replacement

To replace a LRU-15/A manifold (manifold P/N C-50980 is the only authorized replacement), proceed as follows:

Materials Required:
- Torque Wrench (capable of 0 to 300 in.-lbs.)
- Manifold P/N C-50980
- Seal, Copper, P/N A50969 (2 ea.)
- Gasket, Nylon, P/N 1106AS108-3, (1 ea.) NIIN 00-960-5735

Step	Action
1	Remove defective manifold P/N 716, 9153 or C-50980 from inflation valve and life raft.
2	**WARNING** When reinstalling manifold (P/N C-50980), ensure copper seals (P/N A50969) are present and properly positioned around the set screws on the outlets. Do not use nylon gaskets on the outlets with manifold (P/N C-50980).

Continued next page

D.15 LRU-15/A Manifold Replacement (Continued)

The following is a continuation of the replacement procedures for an LRU-15/A manifold.

Step	Action
3	Install new manifold onto inflation valve and life raft. Torque to 140 to 150 in-lbs.
4	Ensure that copper seals A50969 are used on manifold C-50980 at the raft connection points. Nylon gasket P/N 1106AS108-3 is used on the C-50980 manifold at the inflation valve connection point.
5	**NOTE** To reset manifold P/N C-50980 to vent position, apply inward pressure on the head of the Breather Piston, in the center of the stainless steel nut, until reseated in the detent. Push manifold vent/shut poppet in; ensure that vent/shut poppet is down in VENT position.

D.16. SOLAS Grade Reflective Tape Install or Replace

To install or replace reflective tape on an inflatable, proceed as follows:

Materials Required:
- SOLAS Grade Reflective Tape
- Wooden roller
- Acid brush
- Toluene Technical, TT-T-548
- Adhesive, 2141 or
- Adhesive, Polyurethane (LRU-18/C) MIL-A-47315, NIIN 01-375-7855

WARNING

Toluene, TT-T-548 and 3M adhesive 2141 are flammable. Keep from all sources of ignition. Use in a well-ventilated area. Avoid inhalation. Avoid eye and skin contact.

Continued next page

D.16. SOLAS Grade Reflective Tape Install or Replace (Continued)

The following is a continuation of the install or replace reflective tape on an inflatable procedure.

Step	Action
1	Inflate inflatable item to 2.0 PSIG.
2	Cut required pieces and size SOLAS grade reflective tape.
3	Clean designated area(s) of inflatable with a rag dampened in Toluene Technical, TT-T-548.
4	Apply a thin uniform coat of adhesive to the designated area(s) using an acid brush. Allow adhesive to dry for 20 minutes.
5	Remove paper carrier from the adhesive side of the SOLAS grade reflective tape.
6	Apply the adhesive side of the SOLAS grade reflective tape to the designated area(s) of the inflatable.
7	Roll out any wrinkles and air pockets using a wooden roller. **NOTE** The inflatable equipment shall remain inflated and undisturbed for a minimum of 12 hours to allow sufficient curing time for the SOLAS grade reflective tape.

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Section E. LRU-15/A Life Raft

E.1. LRU-15/A Life Raft Introduction

The LRU-15/A 20-person life raft assembly is used as an HC-130 F-2B Wing Raft, Aerial Deliverable Raft 20 (ADR-20), and an ADR-100 (5 LRU-15/A daisy chained).

E.2. LRU-15/A Life Raft Configuration

The LRU-15/A life raft assembly (see figure 2-4), consists of the following

- Flotation Tubes: The raft consists of two single compartment circular tubes connected by an equalizer tube, a non-inflatable floor suspended between the circular tubes, and a built-in inflatable floor support. Topping-off valves are located on each side of the circular tubes and each side of the floor support.

- Inflation Assembly: The two single compartment circular tubes are inflated from a CO_2 cylinder. In an emergency, the raft may be inflated using a hand pump through the Topping-off valves.

- Raft Accessories: Two sea anchors are used to retard drifting and are stowed in the junction of the circular tubes, inner lifeline, boarding handles, and heaving line.

- Survival Equipment: An accessory container is provided for stowage of survival equipment. The type and quantity of survival equipment shall be IAW the MSR MPC card.

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E.2. LRU-15/A Life Raft Configuration (Continued)

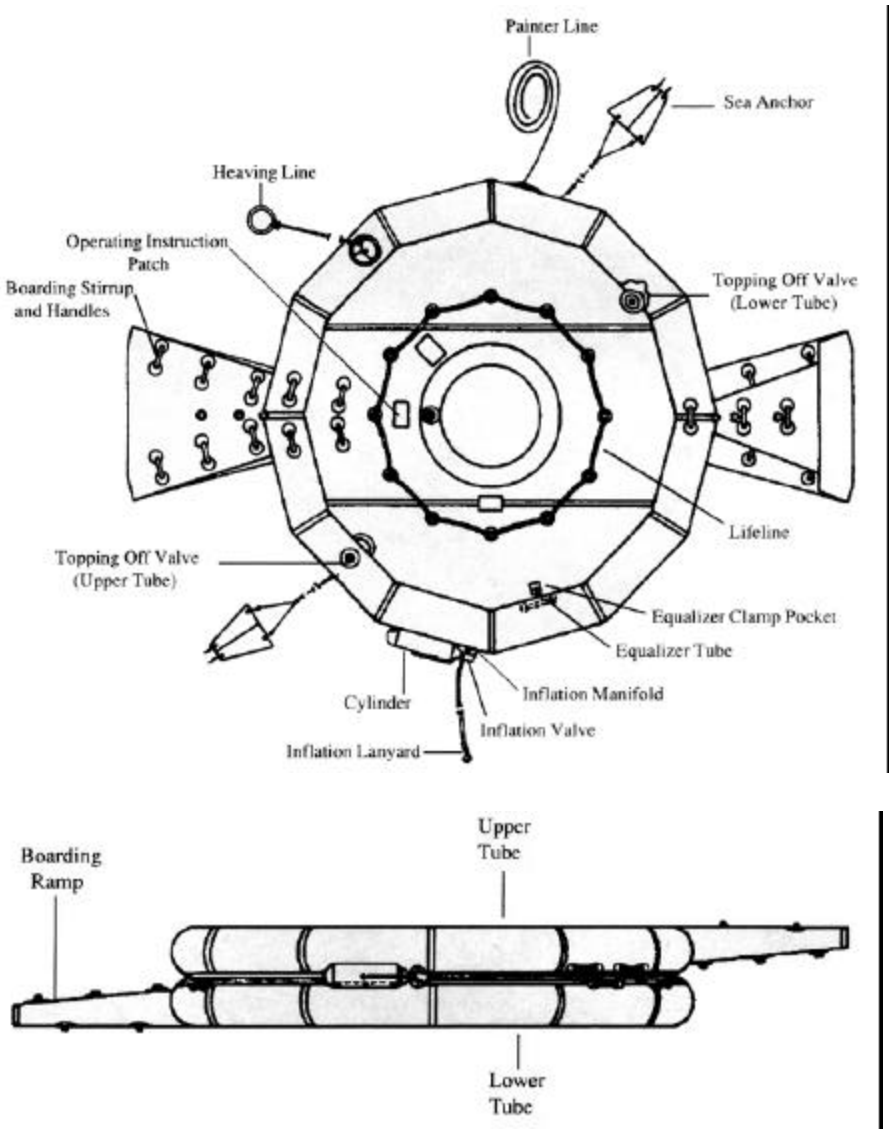

Figure 2-4 LRU-15/A Life Raft

E.3. How a LRU-15/A Life Raft Functions

A unique feature of the LRU-15/A is that it is always right side up after inflation. The inflation assembly inflates the circular tubes and boarding ramps only. In the event the inflation assembly does not function properly, the equalizer tube distributes gas equally between each circular tube. After boarding, the equalizer clamps shall be installed on the equalizer tubes to prevent the complete loss of raft pressure if a hole develops in one of the circular tubes.

Continued next page

E.3. How a LRU-15/A Life Raft Functions (Continued)

Once the equalizer clamps are installed, the floor support is to be inflated with the hand pump provided in the accessory container. The circular tubes may be topped off, if necessary, from either side of the raft floor.

E.4. LRU-15/A Inspection Intervals

The following are inspection intervals for the LRU-15/A life raft.

NOTE

A LRU-15/A life raft packed in the F-2-B configuration may have its inspection intervals extended IAW COMDTINST M13020.1 (series) ACMS Extension Authorization.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will be performed at intervals that coincide with the hydrostatic testing of the CO_2 cylinder, every 60 months.

E.5. LRU-15/A Life Raft Repairs

The table below is a guide to LRU-15/A life raft repair instructions in this chapter.

Step	Action	Section
Determination of Repairability	All LRU-15/A Life Rafts	D. 2.
Cementing Life Rafts	All LRU-15/A Life Rafts	D. 4.
Patching Life Rafts	All LRU-15/A Life Rafts	D. 5.
Re-cementing or Replacing Seam Tapes	All LRU-15/A Life Rafts	D. 6.
Replacement of Topping-Off Valve Opening Insert	All LRU-15/A Life Rafts	D. 7.

Continued next page

E.5. LRU-15/A Life Raft Repairs (Continued)

The table below is a continuation of the guide to LRU-15/A life raft repair instructions in this chapter.

Description	Application	Section
CO_2 Cylinder Poppet Valve replacement	All LRU-15/A Life Rafts	D. 13.
CO_2 Cylinder Valve Safety Disk replacement	All LRU-15/A Life Rafts	D. 14.
CO_2 Manifold replacement	All LRU-15/A Life Rafts	D. 15.
Replace reflective tape	All LRU-15/A Life Rafts	D. 16.

E.6. LRU-15/A Life Raft CO_2 Cylinder Servicing Policy

Units with LRU-15/A life rafts are authorized to either service (recharge) their CO_2 cylinders at their unit, or have them serviced through a local DOD unit, or private business. Units that service their own cylinders must use the servicing system shown in figure 2-5.

E.7. CO_2 Servicing System

Units that service their own cylinders must use the servicing system shown in figure 2-5.

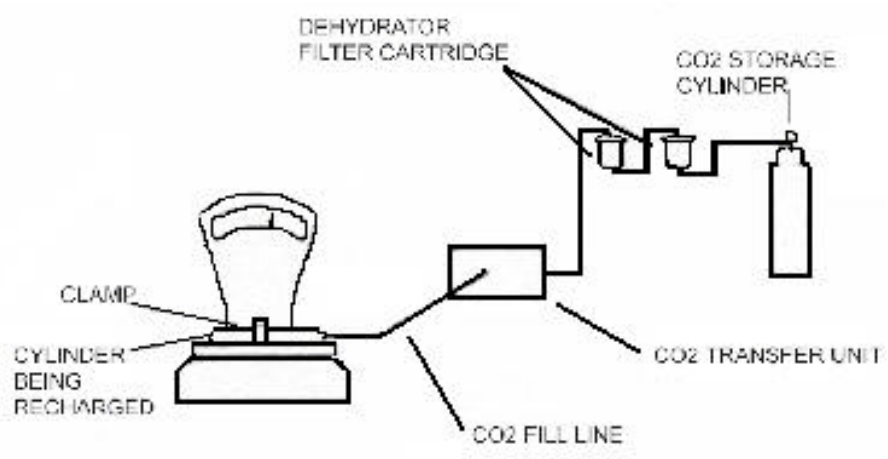

Figure 2-5 CO_2 Servicing Unit

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E.7. CO_2 Servicing System (Continued)

NOTE

To ensure a minimal amount of moisture input to inflation assemblies, all CO_2 shall pass through two purifier assemblies connected in series. The purifier cartridges in each assembly shall be replaced after 250 pounds of CO_2 have passed through cartridges.

NOTE

Supply cylinders not equipped with siphon tube must be inverted during transfer operation. Inverting cylinder allows the liquid to flow from the valve. Supply cylinders with siphon tube (straight pipe) extending from the valve to the bottom of the cylinder can be emptied in the vertical position.

Equipment Required:

- Transfer Unit, NIIN 00-288-0309 or equal
- Dehydrator, NIIN 00-767-9403
- Filter Cartridge, NIIN 00-547-3747
- Scale, Capable of weighing 30 lbs. or more.
- CO_2 Storage Cylinder: See Float Shopping Guide for current NSN. Procure CO_2 locally.

E.8. CO_2 Cylinder Pressure Bleeding

The following CO_2 cylinder pressure bleeding procedures are required whenever the following situations arise:

- Cylinder pressure needs to be adjusted (pressure too high).
- Cylinder is to be sent for hydrostatic testing.
- Cylinder servicing (recharge).

Continued next page

E.8. CO_2 Cylinder Pressure Bleeding (Continued)

WARNING

The diffuser plug must be installed on a CO_2 cylinder at all times, except when servicing the bottle.

WARNING

When discharging partially charged or overcharged CO_2 cylinders, hold firmly in-place with a suitable holding device (vise). Protect CO_2 cylinder from vice jaws with cloth or a suitable substitute. Position cylinders so escaping gas is not directed toward any personnel. Ensure eye and hearing protection is worn.

Step	Action
1	Place cylinder in vise and secure.
2	Remove inflation valve cover.
3	Rotate cam slowly with screwdriver to open position.
4	After the cylinder is empty, proceed to Servicing Procedures in chapter 2, section E.10. **NOTE:** If cylinder is not to be serviced immediately, tag the cylinder **EMPTY**.

Continued next page

E.9. Diffuser Plug Remove/Install Tools

To prevent damage to the CO_2 cylinder valve and the diffuser plug, use the following tools for removal and installation of the diffuser plug (see figure 2-6).

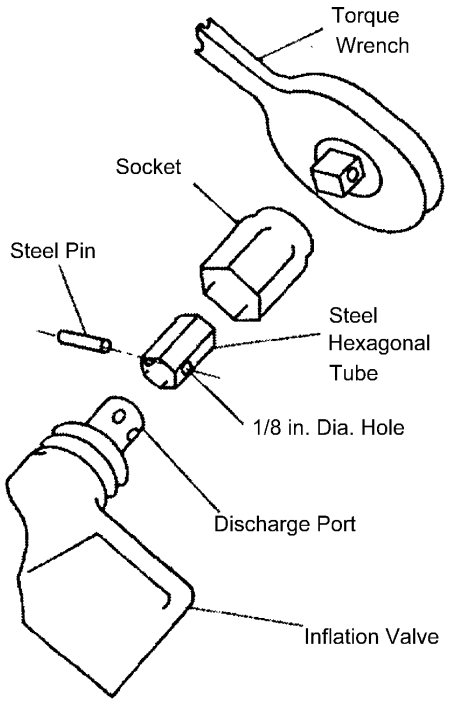

Figure 2-6 Diffuser Plug Removal Tools

Continued next page

E.10. CO_2 Cylinder Servicing

The following procedures shall be used when servicing the LRU-15/A CO_2 cylinder.

Step	Action
1	Ensure cylinder hydrostatic test date has not exceeded 60 months, and will not become due before the next life raft inspection.
2	Ensure cylinder pressure is bled off IAW chapter 2, section E.8.
3	Remove the diffuser plug using the tools shown in section E.9 figure 2-6.
4	Obtain Tare Weight of cylinder: a. Place empty cylinder, inflation valve cover, diffuser plug, and inflation cable on the scale. b. Record weight, and stencil on cylinder.
5	Attach charging adapter on inflation assembly.
6	Secure inflation assembly to scale weighing pan. **NOTE** Ensure inflation valve cover, diffuser plug, and inflation cable are on the scale for all weight measurements.
7	Open supply cylinder valve, fill line valve and relief valve to purge fill line.
8	Close fill line valve and relief valve when a steady flow of CO_2 is flowing from fill line.
9	Ensure fill line is free from contact with any object along entire distance from compressor to charging adapter. If fill line does not hang free, accurate weight readings cannot be obtained.
10	Connect fill line to inflation assembly and zero scale.
11	Ensure inflation assembly valve cam is open (full clockwise).
12	Open fill line valve.
13	Close inflation assembly valve cam (full counter-clockwise).

Continued next page

E.10. CO_2 Cylinder Servicing (Continued)

The following is a continuation of the LRU-15/A CO_2 cylinder servicing procedures.

Step	Action
14	Allow carbon dioxide to cascade from supply cylinder into inflation assembly. If gross weight (tare weight plus CO_2 weight 9.14 to 9.26 lbs.) cannot be reached, start compressor and complete charging. Stop compressor upon reaching proper gross weight.
15	Close fill line valve.
16	Slowly open relief valve on the fill line valve to bleed pressure.
17	Disconnect fill line from inflation assembly.
18	Reinstall diffuser plug, torque to 60 +/- 5 in-lbs. using the tools shown in section E. 9 figure 2-6. **QA REQUIRED**.
19	Remove charging adapter.
20	Measure gross weight of charged inflation assembly.
21	If gross weight of inflation assembly is greater than required, carefully bleed off excess from inflation assembly. If gross weight is less than required, reinstall charging adapter and repeat steps 7 through 20.
22	Close supply cylinder valve, and bleed system pressure.
23	Immerse inflation assembly in water tank.
24	If inflation valve leaks from discharge port, inspect inflation valve poppet assembly for a worn seat IAW chapter 2, section D.13.
25	Check for leaks; then remove assembly from tank. Wipe assembly with a lint-free cloth.
26	If required, using ¼-in. stencils and Black Stencil Ink A-A-1558, re-stencil tare weight, gross weight, charge weight on cylinder.
27	Install pull cable and valve cover IAW MSR MPC.

Continued next page

E.11. F-2B Wing Life Raft Packing Cradle

Figure 2-7 shows the construction dimensions for building a F-2B wing life raft packing cradle. The wood used shall be 1” x 4” pine shelving or equal.

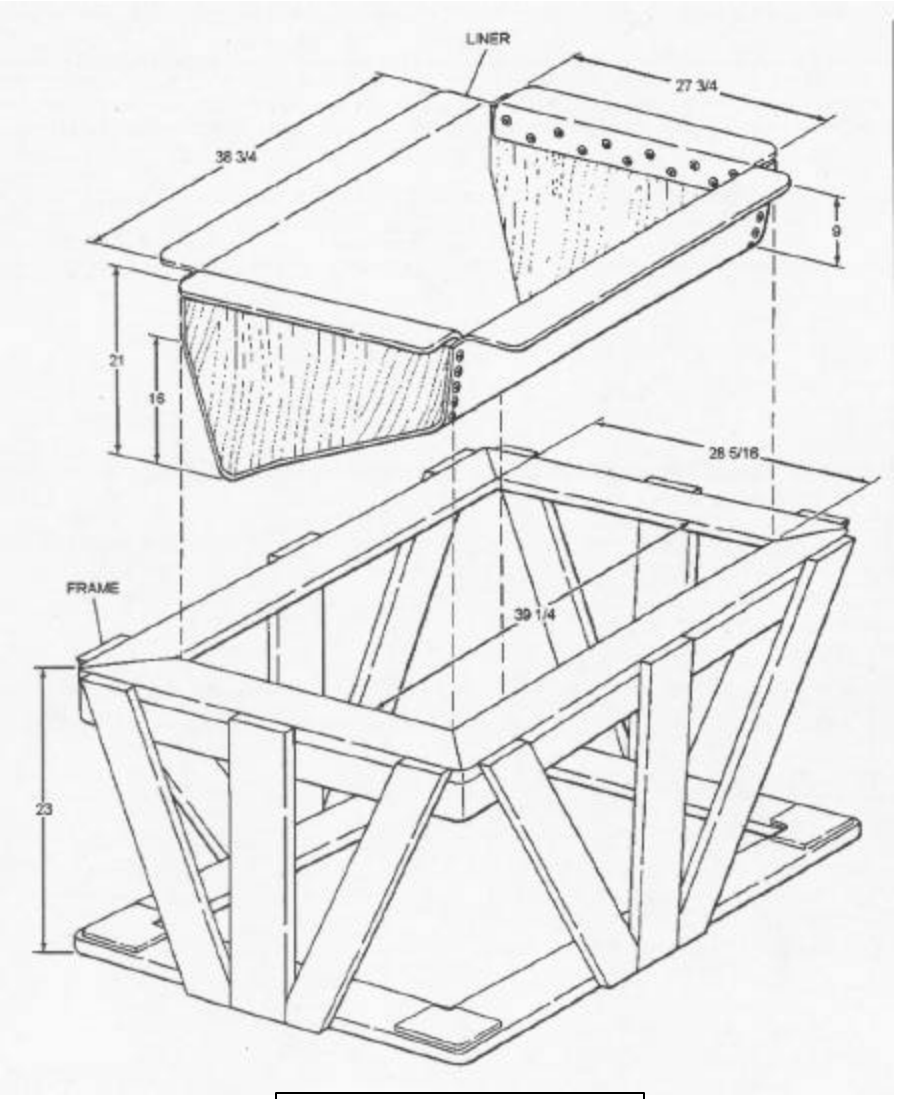

Figure 2-7 F-2B Wing Life Raft Cradle

Section F. LRU-18/C Life Raft

F.1. LRU-18/C Life Raft Introduction

The LRU-18/C single person life raft assembly is used as the rescue swimmer raft and in the HH-60J Seat Raft Assembly.

F.2. LRU-18/C Life Raft Configuration

The LRU-18/C one-person life raft assembly (see figure 2-8) consists of the following:

- Flotation Cells: The life raft has two separate flotation chambers: upper second, third, and fourth cells are inflated from a CO_2 cylinder; the remaining cells have provisions for oral inflation.

- Inflation Assemblies: A CO_2 inflation valve assembly (uses CO_2 cylinder NIIN 00-837-3322) and oral inflation tubes are provided for life raft inflation. In an emergency, the rafts CO_2 chamber may be inflated orally through its own oral inflation tube.

- Raft Accessories: Accessories include a canopy, which can also be used as a bailing device, a sea anchor, a float strobe light, a Mini B or Mini B2 Emergency Position Indication Radio Beacon (EPIRB), and a container assembly for holding the life raft.

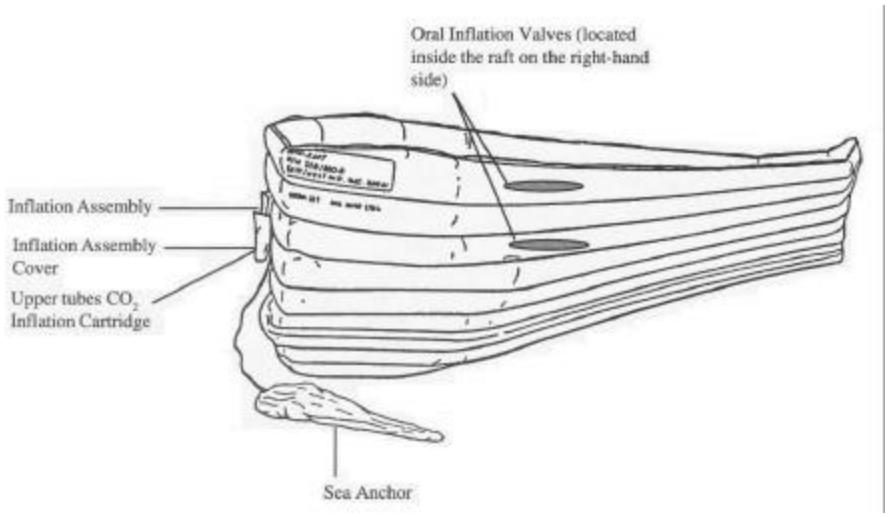

Figure 2-8 LRU-18/C Life Raft

Continued next page

F.3. How a LRU-18/C Life Raft Functions

WARNING

Do not inflate the LRU-18/C prior to egressing aircraft.

The LRU-18/C life raft assembly is configured for use as the HH-60J seat raft assembly and by helicopter Rescue Swimmers during operational missions. The raft is used to provide flotation should an HH-60J ditch at sea or the R/S is left on scene for any reason. It may also be used to stage multiple survivors.

The LRU-18/C life raft assembly is inflated manually by pulling the beaded inflation handle on the life raft container assembly. The inflation assembly inflates the life raft, releasing it from the life raft container assembly. A retention lanyard, attached from the life raft container to the inflation assembly, prevents the raft from floating away upon entry into the water. After boarding, additional buoyancy and freeboard may be added by orally inflating the oral inflation chamber.

F.4. LRU-18/C Inspection Intervals

The following are inspection intervals for the LRU-18/C life raft.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will normally be performed at intervals that coincide with every sixth leak test inspection or every 36 months.

Continued next page

F.5. LRU-18/C Life Raft Repairs

The table below is a guide to LRU-18/C life raft repair instructions in this chapter. LRU-18/C life raft repairs are limited to those listed in the table.

Description	Application	Section
Determination of repairability	All LRU-18/C Life Rafts	D. 2.
Cementing life rafts *Only Polyurethane Adhesives shall be used on the LRU-18/C life raft.*	All LRU-18/C Life Rafts	D. 4.
Patching life rafts *Only Polyurethane Adhesives shall be used on the LRU-18/C life raft.*	All LRU-18/C Life Rafts	D. 5.
Re-cementing or replacing seam tapes *Only Polyurethane Adhesives shall be used on the LRU-18/C life raft.*	All LRU-18/C Life Rafts	D. 6.
Replacement of CO_2 inflation valve assembly and gaskets	All LRU-18/C Life Rafts	D. 8.
Replacing gaskets on CO_2 inflation valve assemblies	All LRU-18/C Life Rafts	D. 9.
Repair of corroded CO_2 inflation assemblies	All LRU-18/C Life Rafts	D. 10.
Replacement of check valve in CO_2 inflation valve assembly	All LRU-18/C Life Rafts	D. 11.
Replacement of beaded inflation handle assembly	All LRU-18/C Life Rafts	D. 12.
Replace reflective tape *Only Polyurethane Adhesives shall be used on the LRU-18/C life raft.*	All LRU-18/C Life Rafts	D. 16.

Section G. LRU-20/A Life Raft

G.1. LRU-20/A Life Raft Introduction

The LRU-20/A 6-person life raft assembly is used as an Aircrew life raft, Aerial Deliverable Raft 6 (ADR-6), and an ADR-18 (3 LRU-20/A daisy chained).

G.2. LRU-20/A Life Raft Configuration

The LRU-20/A 6-person life raft assembly (see figure 2-9) consists of the following:

- Flotation Tubes: The raft consists of two octagonal tubes (one above the other) with a floor attached to the bottom of the lower buoyancy tube, each tube has its own overpressure valve, and a topping-off valve.

- Inflation Assembly: A high-pressure compressed air cylinder with inflation valve inflates the two octagonal tubes. In an emergency, the raft may be inflated using a hand pump through the Topping-Off Valves.

- Raft Accessories: To provide stability (and self-righting capabilities) the raft has an encircling toroidal stability skirt attached to the lower flotation tube. Also included is a boarding ladder with boarding handle, inflatable arch with adjustable canopy, sea anchor, heaving line with storage pocket, inner and outer encircling lifelines, righting strap, and removable inflatable floor insert.

- Survival Equipment: Two accessory containers are provided for stowage of survival equipment. The type and quantity of survival equipment shall be IAW the MSR MPC.

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G.2. LRU-20/A Life Raft Configuration (Continued)

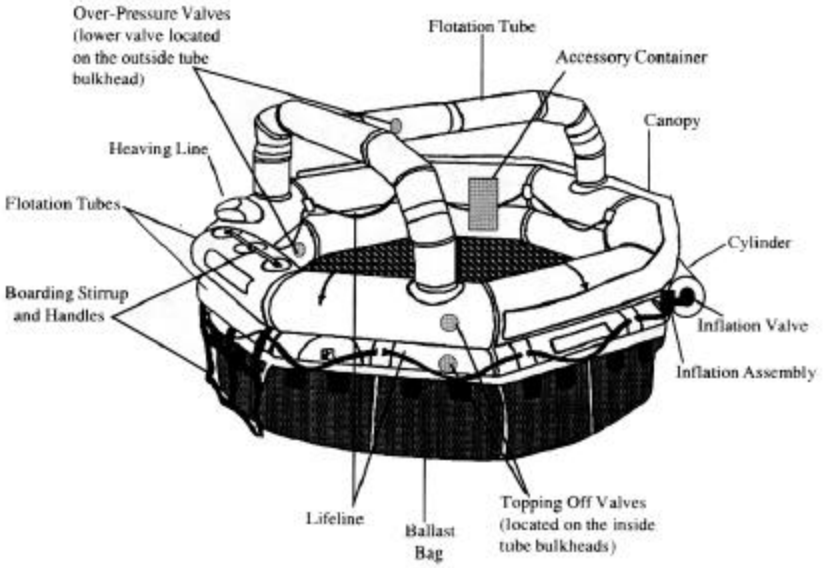


Figure 2-9 LRU-20/A Life Raft

G.3. How a LRU-20/A Life Raft Functions

The LRU-20/A life raft assembly is inflated by pulling the inflation assembly actuation handle. All LRU-20/A life raft assemblies shall be stowed in a readily accessible area inside the fuselage of the aircraft. After boarding, the inflatable floor is inflated either orally or through the topping-off valve with the hand pump provided in the survival bag. The LRU-20/A life raft can be configured as an aircrew raft or can be configured as an Air Droppable Raft (ADR) deployed to survivors at sea.

G.4. LRU-20/A Inspection Intervals

The following are inspection intervals for the LRU-20/A life raft.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will be performed at intervals that coincide with the hydrostatic testing of the composite compressed air cylinder, every 36 months.

Continued next page

G.5. LRU-20/A Life Raft Repairs

The table below is a guide to LRU-20/A life raft repair instructions in this chapter.

Description	Application	Section
Determination of repairability	All LRU-20/A Life Rafts	D. 2.
Cementing life rafts	All LRU-20/A Life Rafts	D. 4.
Patching life rafts	All LRU-20/A Life Rafts	D. 5.
Re-cementing or replacing seam tapes	All LRU-20/A Life Rafts	D. 6.
Replacement of topping-off valve opening insert	All LRU-20/A Life Rafts	D. 7.
Replace reflective tape	All LRU-20/A Life Rafts	D. 16.

G.6. Cylinder Pressure Bleeding

The following cylinder pressure bleeding procedures are required whenever the following situations arise:

- Cylinder pressure needs to be adjusted (pressure too high).
- Cylinder is to be sent for hydrostatic testing.

WARNING

When discharging partially charged or overcharged cylinders, hold firmly in-place with a suitable holding device (vise). Protect cylinder from vice jaws with cloth or a suitable substitute. Position cylinders so escaping gas is not directed toward any personnel. Ensure eye and hearing protection is worn.

Continued next page

G.6. Cylinder Pressure Bleeding (Continued)

The following is the continuation of the cylinder pressure bleeding procedures.

Step	Action
1	Ensure cylinder hydrostatic test date has not exceeded 36 months, and will not become due before the next life raft inspection.
2	Place cylinder in vise and secure.
3	Remove fill plug or fill fitting, as required, from the inflation head and install bleed fitting.
4	Tighten bleed fitting and slowly bleed air until desired pressure is reached.
5	Remove bleed fitting and reinstall fill plug as required.

G.7. Cylinder Servicing

The following procedures shall be used when servicing the LRU-20/A cylinder.

Materials Required:
- Torque Wrench (capable of 0 to 75 ft.-lbs.)
- Torque Wrench (capable of 0 to 100 in.-lbs.)
- 5/32-in. Allen wrench

Step	Action
1	Ensure cylinder hydrostatic test date has not exceeded 36 months, and will not become due before the next life raft inspection. **NOTE** If cylinder has had a recent hydrostatic test and an inflation valve is not installed, only install inflation valve reconditioned IAW applicable MSR MPCs. Torque inflation valve to 35 ft-lbs.
2	Remove the fill plug from the side of the cylinder head using a 5/32-in. Allen wrench.
3	Screw filler fitting into valve. Torque to 50 in-lbs., ensuring O-ring is in place to prevent air leakage.

Continued next page

G.7. Cylinder Servicing (Continued)

The following is a continuation of the LRU-20/A cylinder servicing procedures.

Step	Action
4	Attach air source to the schrader valve end of the quick disconnect fitting and torque to 50 in.-lbs.
5	Connect quick disconnect to fill fitting and open schrader valve.
6	**CAUTION** *The over-pressure valve is designed to vent at 3,500 PSIG.* Service the cylinder to 3,000 PSIG and allow to cool for 2 hours.
7	Reservice cylinder to 3,000 PSIG and allow to cool for 1 hour.
8	Reservice to 3,000 PSIG.
9	**CAUTION** *The servicing line remains under high pressure when the schrader valve is closed.* **NOTE** The quick disconnect will not release from the fill fitting while under high pressure. Close schrader valve and slowly loosen fill fitting until check valve inside valve head closes. The quick disconnect may now be removed.
10	**NOTE** If check valve does not close repeat step 8. If check valve does not close after repeating step 8 twice, bleed off pressure IAW chapter 2, section G.6, then re-lubricate fill fitting piston IAW MSR MPC # 256078.0). If necessary to reduce cylinder pressure refer to chapter 2, section G.6.
11	Remove fill fitting and weigh cylinder with all parts (discharge cap and fill plug). **QA REQUIRED**

Continued next page

G.7. Cylinder Servicing (Continued)

The following is a continuation of the LRU-20/A cylinder servicing procedures.

Step	Action
12	Stencil new gross weight on cylinder in ½in. characters. **QA REQUIRED**
13	Install fill plug, check that O-ring has not been damaged, torque to 10 ft-lbs.
14	Slide the cable cover over the cable and tie the cover to the inflation head at the spring cap with a square knot.

Section H. Life Preserver/Survival Vest Maintenance

H.1. Types of Maintenance

Maintenance of life preserver/survival vest consists of the following:

- Routine Inspections
- Calendar Inspections
- Special Inspections
- Cleaning of air bladders
- Cleaning of vest cases and bladder containers

H.2. Routine Inspections

All life preservers/survival vests will be inspected on a routine basis in accordance with this manual. The frequency of these inspections prohibits use of the computer for scheduling. Specific criteria for each type of preserver/survival vest inspection will be given in their respective section. Required routine inspections are as follows:

- Preflight Inspection: This inspection shall be performed prior to each flight by the crewmember that will wear it. In the case of a non-qualified passenger, one of the crewmembers assigned to the flight shall preflight the life preserver/survival vest.
- Post-flight Inspection: Only the HEED III device requires this inspection. This inspection shall be performed after each flight by the crewmember that wore it.
- Weekly Inspections: This inspection is designed to provide verification of satisfactory condition of critical components at frequent intervals. An AST shall perform this inspection.

Continued next page

H.3. Calendar Inspections

All life preservers/survival vests will be inspected on a calendar basis in accordance with the appropriate MSR MPC, not to exceed 180 days. Inspection intervals can be found in this manual under the appropriate life preserver/survival vest section. Three types of calendar inspections are as follows:

- Acceptance
- Leak Test
- Functional Test

H.4. Special Inspections

A special inspection of life preservers/survival vests in storage or in service will be performed whenever conditions warrant. The AST shop supervisor, following review of the circumstances or conditions to which the life preserver/survival vest has been subjected, will determine the extent of the special inspection. If another inspection is warranted the AST shop supervisor will direct the appropriate inspection, regardless of the last inspection date.

H.5. Commercial Inspections

The approved fixed-wing airline passenger style life preservers shall be inspected by a manufacturer-approved facility IAW the manufactures recommended timelines.

H.6. Cleaning Air Bladders

Air bladders shall be cleaned using the following procedures.

Step	Action
1	Remove the air bladder from the container or case.
2	Clean the air bladder IAW chapter 2, section C.4.

Continued next page

H.7. Cleaning of Vest Cases and Bladder Containers

Vest cases and bladder containers shall be cleaned using the following procedures.

Step	Action
1	Remove the air bladder from the container or case.
2	Close slide fasteners to prevent damage to fabric.
3	Using mild soap and warm water, launder container or case by hand.
4	Thoroughly rinse container or case with fresh tap water.
5	Squeeze out excess water (do not wring).
6	Hang container or case on wooden hanger to air dry in a well-ventilated area.

Section I. Life Preserver/Survival Vest Repairs

I.1. Life Preserver/ Survival Vest Repair Overview

This section contains instructions for the repair of various components and subassemblies of life preservers to ensure that appropriate items of equipment remain in Ready For Issue (RFI) status. Reference numbers for replacement parts that are defective and require replacement can be found on the ALSIPS. All repairs shall be documented on the applicable MSR MPC.

I.2. Determination of Repairability

Life preservers shall be considered beyond repair for any of the following reasons:

NOTE

There are no bladder repairs authorized on an LPU-26/P or LPU-26/PE life preserver.

- Porous fabric areas on tubes that cause a leak test failure.
- Split or open bladder seams.
- Holes, cuts, tears, or punctures over 1-inch square or within 1-inch of a seam on an LPP-1A.

I.3. Condemned Life Preserver /Survival Vest

If inspection indicates damage, which is beyond capabilities of the AST shop, the assembly shall be condemned. Condemned life preservers/survival vests will be stripped. All serviceable parts shall be retained in local stock for repair purposes. Condemned life preservers/survival vests shall be utilized for drill purposes. All preservers/ vests utilized in this manner shall be marked, DRILL ONLY in ¾ inch black letters on 1-inch white webbing attached to vest/container to preclude mixing drill equipment with RFI equipment.

I.4. Replacement of CO_2 Inflation Assemblies and Gaskets

To replace CO_2 inflation valve assemblies and gaskets, refer to chapter 2 section D.8.

I.5. Replacement of Gaskets on CO_2 Inflation Assemblies

To replace gaskets on CO_2 inflation valve assemblies, refer to chapter 2 section D.8.

Continued next page

I.6. Replacement of Check Valves in CO_2 Inflation Assemblies

To replace check valves in CO_2 inflation assemblies, refer to chapter 2, section D.11.

I.7. Repair of Corroded CO_2 Inflation Assemblies

To repair corroded inflation assemblies, refer to chapter 2, section D.10.

I.8. Repair of Holes, Tears, and Cuts in Survival Vests

To repair holes, tears, and cuts in survival vests, proceed as follows:

Materials Required:
- Sail Needle
- Thread Nylon Size E
- Cloth Nylon, material equivalent to item being repaired

Step	Action
1	Repair small holes, tears, and cuts by hand darning with size E nylon thread.
2	Repair large holes by patching; Baseball Stitch patch over hole. Lock first and last stitch with overhand knot.

I.9. Replacement of Nylon Cord

Replacement of the nylon cord securing the bladder assembly to the casing shall be performed in accordance with the applicable equipment MSR MPC.

Continued next page

I.10. Replacement of Grommets

To replace grommets on life preservers and survival vests, proceed as follows:

Materials Required:
- Scissors
- Screwdriver
- Diagonal Wire Cutter
- Grommet
- Grommet Washer
- Nylon Searing Tool
- Chuck and Die
- Material equivalent to item being repaired

Step	Action
1	Cut crimped edge of damaged grommet at three or four points.
2	Remove old grommet and washer.
3	Cover hole in grommet flap with square patch that is ¼-inch larger than grommet washer. Stitch patch on all four sides with two rows of stitching, using 8 to 10 stitches per-inch.
4	Punch a hole in center of patch the same size as inside diameter of grommet washer.
5	**NOTE** Flat side of replacement grommet shall face inside of life preserver or survival vest. Place grommet washer on underside of patch. Place grommet on top of patch.
6	Set grommet and grommet washer in place with correct size chuck and die.
7	If crimped edge of the grommet has any sharp edges, remove two rows of stitches around patch and repeat steps 1 through 6.

Continued next page

I.11. Replacement of Plastic Snap Fasteners with Metal Snap Fasteners

To replace plastic snap fasteners with metal snap fasteners, proceed as follows:

Materials Required:
- Fastener Snap Style 2 Button Size 1
- Fastener Snap Style 2 Socket
- Fastener Snap Style 2 Stud
- Fastener Snap Style 2 Eyelet Size 1
- End cutters

NOTE

When replacing a defective snap fastener, the mating snap fastener must also be replaced.

Step	Action
1	Using end cutters, remove damaged plastic snap fastener stud and mating socket from eyelets and buttons.
2	Install new metal snap fasteners as necessary.

I.12. Replacement of Waist Buckle

To replace buckle, proceed as follows:

Materials Required:
- Buckle Waist
- Thread size E, V-T-295

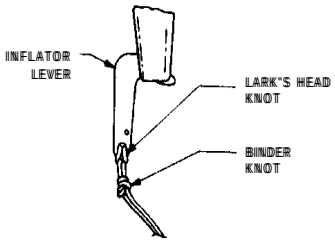
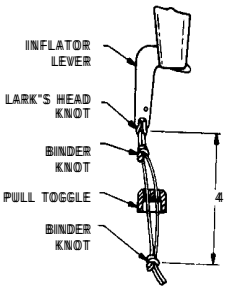
Step	Action
1	Cut both cross-stitches adjacent to the buckles on the front belt.
2	Remove the buckle from the webbing, and route webbing through new buckle.
3	Fold webbing under 3 inches on each side of buckle and cross-box-stitch (8-10 SPI) using same dimensions as the previous buckle.

Continued next page

I.13. Replacement of Inflation Lanyard

To replace inflation lanyard, proceed as follows:

Materials Required: - Cord Nylon MIL-C-5040 Type I.

Step	Action
1	Carefully remove cylinder from applicable inflation assembly.
2	If desired, remove cap-nut and top gasket retaining the inflation assembly, and remove inflation assembly from bladder.
3	Cut lanyard to be replaced.
4	Fold sufficient length of type I cord in half, pass closed end through hole in end of inflator lever and secure with lark's head knot followed by a binder knot. 
5	Thread the cord strands through the applicable pull toggle, one strand in each hole and tie a binder knot approximately 4 inches from end of inflator lever. 

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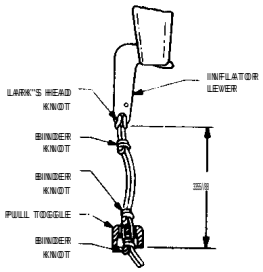
I.13. Replacement of Inflation Lanyard (Continued)

The following is a continuation of the replacement of inflation lanyard.

Step	Action
6	Slide pull-toggle down to single knot and tie a binder knot on top of the pull toggle to secure it in position. Ensure 3 5/8 inches exists between end of lever to bottom of pull toggle when nylon cord is pulled tight. 
7	If required, reinstall inflation assembly, top gasket and cap-nut. Tighten cap-nut to a torque value of 8 +/- 1 inch-pound.

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I.14. Patching a LPP-1A Life Preserver

To patch a LPP-1A life preserver, proceed as follows:

Materials Required:
- Cloth, Life Preserver, Type I, Orange MIL-C-19002 NIIN 00-060-9136

-or-

- Cloth, Life Preserver, Type I, Yellow MIL-C-19002 NIIN 00-935-6427
- Polychloroprene Adhesive

CAUTION

Use only Polychloroprene adhesive and Polychloroprene- coated cloth patches on Polychloroprene-coated LPP-1A life preserver assemblies.

NOTE

AN LPP-1A life preserver is not repairable if it has holes, cuts, tears, or punctures over 1-inch square.

Step	Action
1	Cut a rounded patch 1-inch larger on all sides than the damage .
2	Center patch over damage and trace an outline of patch on fabric w/lead pencil.
3	Cement patch to damaged area in accordance with chapter 2, section D.4.
4	Perform a leakage test.

Section J. LPP-1A Life Preserver

J.1. LPP-1A Life Preserver Configuration

WARNING

Do not inflate the LPP-1A prior to egressing aircraft.

NOTE

The LPP-1A life preserver assembly is the only preserver authorized for use by passengers in cargo or transport type aircraft for sea survival situations.

The LPP-1A life preserver assembly weighs approximately 3 pounds and provides a minimum of 29 pounds of buoyancy (see figure 2-10). The LPP-1A life preserver assembly consists of the following:

- Flotation Bladder Assembly: Single yoke-type compartment polychloroprene coated nylon cloth constructed

- Inflation Assemblies: CO_2 cartridge type inflation valve, and a built-in oral inflation valve

- Pouch and Belt Assembly: Adjustable to waist sizes 30 to 52 inches and attaches the flotation assembly and pouch to the wearer by means of the belt loop on the flotation assembly and the slots in the back of the pouch.

- Storage Container: Orange nylon cloth, with operating instructions stenciled on the container.

- Survival Equipment: Fox 40 whistle, sea dye marker, and saltwater-activated survivor locator light (fresh water units use the CG-1 strobe light). A toggle assembly consisting of a wooden toggle and line is provided for survivors to secure themselves together while they are in the water. When not in use, the toggle line is wrapped around the wooden toggle and stowed in a pocket located in the belt.

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J.1. LPP-1A Life Preserver Configuration (Continued)

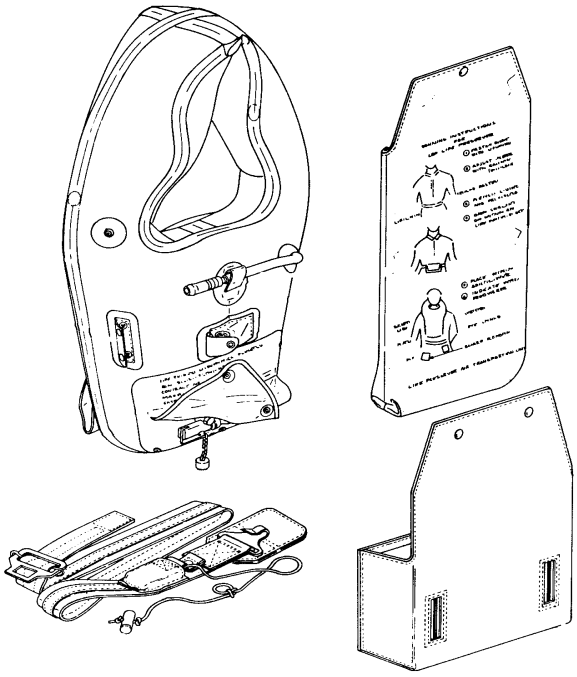

Figure 2-10 LPP-1A Life Preserver

J.2. How a LPP-1A Life Preserver Functions

Inflation of the LPP-1A is either by CO_2 cartridge contained in the vest or by the built-in oral inflation valve. After aircraft egress, inflate the LPP-1A by pulling down and slightly outward on the CO_2 inflation valve assembly pull toggle. In an emergency, the oral inflation tube should be used to top off an inflated preserver, or to inflate a preserver if the inflation valve assembly malfunctions.

J.3. LPP-1A Inspection Intervals

The following are inspection intervals for the LPP-1A.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will normally be performed at intervals that coincide with every sixth leak test inspection or every 36 months.

Continued next page

J.4. LPP-1A Preflight Check

It is the responsibility of AST shop personnel to train unit personnel how to perform a Preflight Check of the life preservers to be used on each flight. To perform a preflight check of a LPP-1A life preserver, proceed as follows:

WARNING

Ensure that inflation pull toggle is readily accessible, extending from the protective flap.

Step	Action
1	Inspect exposed metal/plastic parts for corrosion and/or damage.
2	Inspect belt for wear, tears, and abrasions.
3	Inspect belt for proper routing through the belt loop on the flotation assembly.
4	Inspect attachment of inflation lanyard to pull toggles.
5	Inspect attached equipment for proper location and quantity.
6	Report noted discrepancies to Maintenance Control.

Continued next page

J.5. LPP-1A Weekly Inspection

It is the responsibility of AST shop personnel to perform weekly inspections on all LPP-1A life preservers installed in an aircraft and all RFI spares. The AST shop shall maintain records of completed weekly inspections for 6 months. To perform a weekly inspection of a LPP-1A life preserver, proceed as follows:

WARNING

Ensure that inflation pull toggle is readily accessible, extending from the protective flap.

Step	Action
1	Inspect exposed metal/plastic parts for corrosion and/or damage.
2	Inspect inflation assembly and breakaway thread. Ensure $C0_2$ cartridge is secured.
3	Inspect bladder for contamination (oil, salt, etc.), wear, tears, snags, and abrasions.
4	Inspect survival items for presence, security of attachment and, if applicable, operation.
5	Inspect container fabric for cuts, tears, abrasions, security of stitching and other damage.
6	Inspect lanyard safety-tie, replace if missing. The lanyard safety-tie may be replaced without removing the preserver from service.
7	If any discrepancy is noted, the preserver shall be removed from service and repaired in accordance with procedures in this chapter.

Continued next page

J.6. LPP-1A Life Preserver Repairs

The table below is a guide to LPP-1A life preserver repair locations in this chapter.

Description	Application	Section
Determination of repairability	All LPP-1A Life Preservers	I. 2.
Cementing life preserver	All LPP-1A Life Preservers	I. 14.
Replacement of plastic snap fasteners with metal snap fasteners	All LPP-1A Life Preservers	I. 11.
Replacement of CO_2 inflation assemblies	All LPP-1A Life Preservers	D. 8.
Replacement of inflation valve gaskets	All LPP-1A Life Preservers	D. 8.
Replacement of check valve in CO_2 inflation valve assembly	All LPP-1A Life Preservers	D. 11.
Replacement of Inflation Lanyard P/N 975AS121-12	All LPP-1A Life Preservers	I. 13.
Repair of corroded CO_2 inflation assemblies	All LPP-1A Life Preservers	D. 10.
Replacement of reflective tape	All LPP-1A Life Preservers	D. 16.

Section K. LPU-26/P Survival Vest

K.1. LPU-26/P Survival Vest Configuration

The LPU-26/P survival vest (see figure 2-11) is designed for constant wear, and is used by fixed wing aircrew members. It weighs approximately 5 lbs. including equipment, and provides a minimum of 22 pounds of buoyancy. The LPU-26/P survival vest consists of the following assemblies.

- Flotation Bladder Assembly: The LPU-26/P flotation bladder consists of a single bladder with two (upper and lower) chambers.

- Inflation Assemblies: The upper and lower chambers are inflated mechanically through CO_2 inflation valves, or orally by means of built-in oral inflation tubes.

- Vest/Flotation Casing: The vest/flotation casing is constructed of lightweight blue nomex mesh with a belt assembly that contains the pocket sub-assemblies for individual survival equipment stowage. The bladder assembly is attached to the vest/flotation casing with gutted type III, nylon cord. The LPU-26/P comes in one size, and is secured to the wearer with a slide fastener closure and an adjustable belt assembly.

- Survival Equipment: Two pockets are provided (one on the wearer's left and one on the right) for stowage of survival equipment. The type and quantity of survival equipment shall be IAW the MSR MPC.

Continued next page

K.1. LPU-26/P Survival Vest Configuration (Continued)

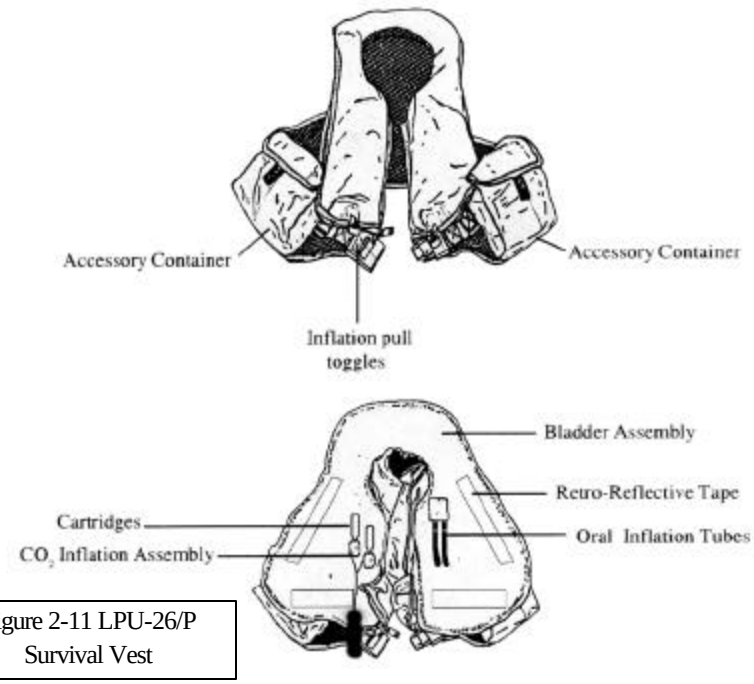

Figure 2-11 LPU-26/P Survival Vest

K.2. How a LPU-26/P Survival Vest Functions

Inflation of the LPU-26/P is either by CO_2 cartridge contained in the vest or by the built-in oral inflation valve. After aircraft egress, inflate the LPU-26/P by pulling down and slightly outward on the CO_2 inflation valve assembly pull toggle. In an emergency, the oral inflation tubes should be used to top off an inflated preserver, or to inflate a preserver if the inflation valve assembly malfunctions.

K.3. LPU-26/P Survival Vest Inspection Intervals

The following are inspection intervals for the LPU-26/P survival vest.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will normally be performed at intervals that coincide with every sixth leak test inspection or every 36 months.

Continued next page

K.4. LPU-26/P Survival Vest Preflight Check

It is the responsibility of AST shop personnel to train unit personnel how to perform a Preflight Check of the LPU-26/P survival vest they will use on each flight. To perform a preflight check of a LPU-26/P survival vest, proceed as follows:

WARNING

Ensure that inflation pull toggle is readily accessible, extending from the flotation casing.

CAUTION

Do not open any sealed safety tied portions of preserver for preflight.

Step	Action
1	Inspect exposed metal/plastic parts for corrosion and/or damage.
2	Inspect vest/flotation casing for wear, tears, abrasions, and contamination (oil, fuel, etc.).
3	Inspect attachment of inflation lanyard safety tie.
4	Inspect survival equipment for proper attachment, location, and quantity.
5	Report noted discrepancies to Maintenance Control.

Continued next page

K.5. LPU-26/P Survival Vest Weekly Inspection

It is the responsibility of AST shop personnel to perform weekly inspections on all LPU-26/P survival vests that are installed in an aircraft and RFI spares. To perform a weekly inspection of a LPU-26/P survival vest, proceed as follows:

WARNING

Ensure that inflation pull toggle is readily accessible, extending from the flotation casing.

Step	Action
1	Inspect exposed metal/plastic parts for corrosion and/or damage.
2	Inspect vest/flotation casing for wear, tears, abrasions, security of stitching, and contamination (oil, fuel, etc.).
3	Inspect lanyard safety-tie, if missing, replace. The lanyard safety-tie may be replaced without removing the preserver from service.
4	Inspect inflation assembly and breakaway thread. Ensure CO_2 cartridge is secured.
5	Inspect survival equipment for presence, security of attachment and, if applicable, operation.
6	If any discrepancy is noted, the preserver shall be removed from service and repaired in accordance with procedures in this chapter.

Continued next page

K.6. LPU-26/P Survival Vest Repairs

The table below is a guide to LPU-26/P survival vest repair locations in this chapter.

Description	Application	Section
Determination of repairability	All LPU-26/P Survival Vests	I. 2.
Cementing life preservers	All LPU-26/P Survival Vests	I. 2.
Replacement of plastic snap fasteners with metal snap fasteners	All LPU-26/P Survival Vests	I. 11.
Replacement of CO_2 inflation valve assemblies	All LPU-26/P Survival Vests	D. 8.
Replacement of inflation valve gaskets	All LPU-26/P Survival Vests	D. 8.
Replacement of check valve in CO_2 inflation valve assembly	All LPU-26/P Survival Vests	D. 11.
Replacement of beaded (pull) inflation lanyard (Using Lifesaving Systems Corp., Lanyard P/N 488I)	All LPU-26/P Survival Vests	D. 12.
Repair of corroded CO_2 inflation assemblies	All LPU-26/P Survival Vests	D. 10.
Repair of holes, tears, and cuts in survival vest	All LPU-26/P Survival Vests	I. 8.
Replacement of nylon cord	All LPU-26/P Survival Vests	I. 9.
Replacement of waist buckle	All LPU-26/P Survival Vests	I. 12.
Replacement of reflective tape	All LPU-26/P Survival Vests	D. 16.

Section L. LPU-26/PE Survival Vest

L.1. LPU-26/PE Survival Vest Configuration

The LPU-26/PE survival vest (see figure 2-12) is designed for constant wear, and is used by rotary-wing aircrew members. It weighs approximately 5 lbs. including equipment and provides a minimum of 22 pounds of buoyancy. The LPU-26/PE survival vest consists of the following assemblies.

- Flotation Bladder Assembly: The LPU-26/PE flotation bladder consists of a single bladder with two (upper and lower) chambers. This is the same bladder used in the LPU-26/P Survival Vest.

- Inflation Assemblies: The inboard and outboard chambers are inflated mechanically through CO_2 inflation valves, or orally by means of built-in oral inflation tubes.

- Vest/Flotation Casing: The vest/flotation casing is constructed of lightweight blue nomex mesh with a belt assembly that contains the pocket sub-assemblies for individual survival equipment stowage. The bladder assembly is attached to the vest/flotation casing with gutted type III, nylon cord. The LPU-26/PE comes in one size, and is secured to the wearer with a slide fastener closure and an adjustable belt assembly.

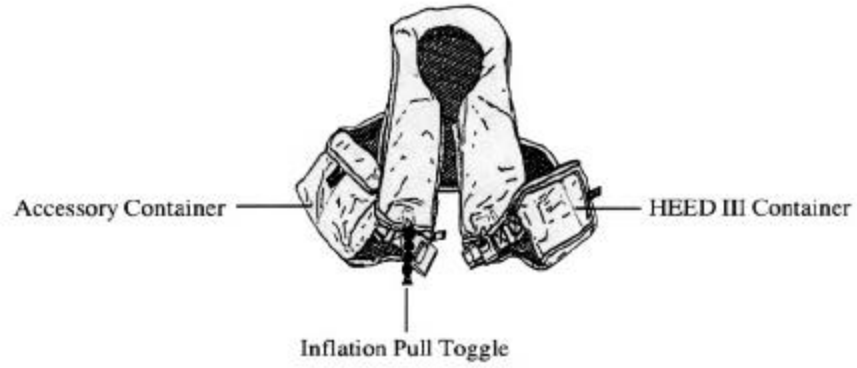

Figure 2-12 LPU-26/PE Survival Vest

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L.2. How a LPU-26/PE Survival Vest Functions

Inflation of the LPU-26/PE is either by CO_2 cartridge contained in the vest or by the built-in oral inflation valve. After aircraft egress, inflate the LPU-26/PE by pulling down and slightly outward on the beaded CO_2 inflation valve lanyard. In an emergency, the oral inflation tubes should be used to top off an inflated preserver, or to inflate a preserver if the inflation valve assembly malfunctions.

L.3. LPU-26/PE Survival Vest Inspection Intervals

The following are inspection intervals for the LPU-26/PE survival vest.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will normally be performed at intervals that coincide with every sixth leak test inspection or every 36 months.

Continued next page

L.4. LPU-26/PE Survival Vest Preflight Check

It is the responsibility of AST shop personnel to train unit personnel how to perform a Preflight Check of the LPU-26/PE survival vest they will use on each flight. To perform a preflight check of a LPU-26/PE survival vest, proceed as follows:

WARNING

Ensure that inflation pull toggle is readily accessible, extending from the flotation casing.

Step	Action
1	Inspect exposed metal/plastic parts for corrosion and/or damage.
2	Inspect vest/flotation casing for wear, tears, abrasions, and contamination (oil, fuel, etc.).
3	Inspect attachment of inflation lanyard safety tie.
4	Inspect survival equipment for proper attachment, location, and quantity.
5	Inspect the HEED III as follows: a. Inspect the HEED III for external damage. b. Inspect the mouthpiece assembly. c. Check for a pressure reading in the green zone on the regulator gauge pressure indicator. d. Check security of attachment of the HEED III to the survival vest.
6	Report noted discrepancies to Maintenance Control.

Continued next page

L.5. LPU-26/PE Survival Vest Post-Flight Inspection

It is the responsibility of AST shop personnel to train unit personnel how to perform a post-flight inspection of the HEED III devices installed in the LPU-26/PE survival vest. This inspection shall be performed by the crewmember that wore the LPU-26/PE survival vest. To perform a post-flight inspection on a HEED III, proceed as follows:

Step	Action
1	Inspect the HEED III for external damage.
2	Inspect the mouthpiece assembly.
3	Check for a pressure reading in the green zone on the regulator gauge pressure indicator.
4	Inspect regulator for signs of salt air/water contamination and cleanliness.
5	If any discrepancy is noted, the preserver shall be removed from service and the discrepancy corrected.

Continued next page

L.6. LPU-26/PE Survival Vest Weekly Inspection

It is the responsibility of AST shop personnel to perform weekly inspections on all LPU-26/PE survival vests that are installed in an aircraft and RFI spares. To perform a weekly inspection of a LPU-26/PE survival vest, proceed as follows:

WARNING

Ensure that inflation pull toggles are readily accessible, extending from the flotation casing.

Step	Action
1	Inspect exposed metal/plastic parts for corrosion and/or damage.
2	Inspect vest/flotation casing for wear, tears, abrasions, security of stitching, and contamination (oil, fuel, etc.).
3	Inspect lanyard safety-tie, if missing, replace. The lanyard safety-tie may be replaced without removing the preserver from service.
4	Inspect inflation assembly and breakaway thread. Ensure CO_2 cartridge is secured.
5	Inspect survival equipment for presence, security of attachment and, if applicable, operation.
6	Inspect the HEED III as follows: a. Inspect the HEED III for external damage. b. Inspect the mouthpiece assembly. c. Check for a pressure reading in the green zone on the regulator gauge pressure indicator. d. Check security of attachment of the HEED III to the survival vest. e. Inspect regulator for signs of salt air/water contamination and cleanliness.
7	If any discrepancy is noted, the preserver shall be removed from service and repaired in accordance with procedures in this chapter.

Continued next page

L.7. LPU-26/PE Survival Vest Repairs

The table below is a guide to LPU-26/PE survival vest repair locations in this chapter.

Description	Application	Section
Determination of repairability	All LPU-26/PE Survival Vests	I. 2.
Cementing life preservers	All LPU-26/PE Survival Vests	I. 2.
Replacement of plastic snap fasteners with metal snap fasteners	All LPU-26/PE Survival Vests	I. 11.
Replacement of CO_2 inflation valve assemblies	All LPU-26/PE Survival Vests	D. 8.
Replacement of inflation valve gaskets	All LPU-26/PE Survival Vests	D. 8.
Replacement of check valve in CO_2 inflation valve assembly	All LPU-26/PE Survival Vests	D. 11.
Replacement of beaded (pull) inflation handle assembly (Using Lifesaving Systems Corp., Lanyard P/N 488I)	All LPU-26/PE Survival Vests	D. 12.
Repair of corroded CO_2 inflation assemblies	All LPU-26/PE Survival Vests	D. 10.
Repair of holes, tears, and cuts in survival vests	All LPU-26/PE Survival Vests	I. 8.
Replacement of nylon cord	All LPU-26/PE Survival Vests	I. 9.
Replacement of waist buckle	All LPU-26/PE Survival Vests	I. 12.
Replacement of reflective tape	All LPU-26/PE Survival Vests	D. 16.

Section M. Tri-SAR Harness

M.1. Tri-SAR Harness Configuration

The Tri-SAR Harness (see figure 2-13) is designed for constant wear, and is worn by rescue swimmers whenever they are deployed from the aircraft. It weighs approximately 9 lbs. including equipment and provides a user variable buoyancy up to 35 pounds. The Tri-SAR Harness consists of the following assemblies.

- Flotation Assembly: The flotation assembly consists of a single flotation cell encased entirely in a heavy weight, puncture/abrasion-resistant nylon cover. Due to its encased design, the cell requires no re-packing after use.

- Inflation Assemblies: The bladder is inflated pneumatically through a CO_2 inflation valve, or orally by means of a built-in oral inflation tube.

- Harness Assembly: The full body harness assembly is constructed primarily of MIL-SPEC type VIII and XIII webbing. Also included in the harness are stainless steel quick-adjusting hardware, lifting V-ring, and a gated lifting ring

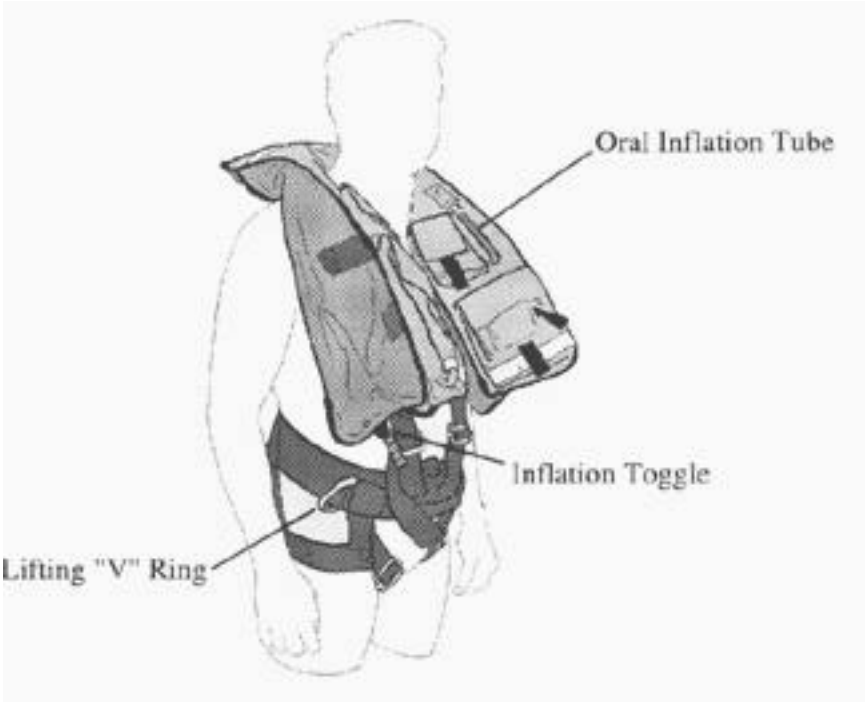

Figure 2-13 Tri-SAR Harness

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M.2. How a Tri-SAR Harness Functions

The Tri-SAR Harness can be inflated either pneumatically by pulling down and slightly outward on the beaded CO_2 inflation valve lanyard or through the built-in oral inflation tube.

M.3. Tri-SAR Harness Inspection Intervals

The following are inspection intervals for the Tri-SAR Harness.

- The acceptance inspection (functional test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The leak test inspection will be performed at intervals not to exceed 180 days.
- The functional test will normally be performed at intervals that coincide with every fourth leak test inspection or every 24 months.

Continued next page

M.4. Tri-SAR Harness Duty-Day Inspection

It is the responsibility of each AST to perform a duty-day inspection on their assigned Tri-SAR Harness. This inspection shall also be performed again after participating on a flight that doesn't warrant a Post-Usage Inspection. To perform a duty-day inspection of a Tri-SAR Harness, proceed as follows:

WARNING

Ensure that inflation pull toggle is readily accessible, extending from the flotation casing.

Step	Action
1	Inspect exposed metal parts for corrosion, damage, and operation.
2	Inspect harness for cut or frayed webbing and stitching, and contamination (oil, fuel, blood, etc.).
3	Inspect flotation cell cover for wear, tears, abrasions, and contamination (oil, fuel, blood, etc.).
4	Inspect attachment of inflation lanyard safety-tie.
5	Inspect survival/rescue equipment for proper attachment, location, quantity, and operation.
6	If any discrepancy is noted, the harness shall be removed from service and repaired in accordance with procedures in this chapter.

Continued next page

M.5. Tri-SAR Harness Repairs

The table below is a guide to Tri-SAR Harness repair locations in this chapter or applicable MPC.

Description	Application	Section
Determination of repairability	All Tri-SAR Harnesses	I.2.
Cementing life preservers	All Tri-SAR Harnesses	I.2.
Replacement of CO_2 inflation valve assemblies	All Tri-SAR Harnesses	D.8.
Replacement of inflation valve gaskets	All Tri-SAR Harnesses	D.8.
Replacement of check valve in CO_2 inflation valve assembly	All Tri-SAR Harnesses	D.11.
Replacement of beaded (pull) inflation lanyard	All Tri-SAR Harnesses	D.12.
Repair of corroded CO_2 inflation assemblies	All Tri-SAR Harnesses	D.10.
Replacing flotation assembly	All Tri-SAR Harnesses	MPC
Re-stitching harness assembly	All Tri-SAR Harnesses	MPC
Replace reflective tape	All Tri-SAR Harnesses	MPC
Reattaching or replacing pocket hook-fastener tape	All Tri-SAR Harnesses	MPC
Repairing damaged pockets	All Tri-SAR Harnesses	MPC
Adding or replacing name tape	All Tri-SAR Harnesses	MPC

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Section A. Aerial Delivery Systems (ADS) Overview

A.1. ADS Introduction

This chapter contains information relating to Aerial Delivery Systems (ADS). It is sectioned to reflect the different functions and equipment data, in addition to specific requirements for use by the Coast Guard. The Aviation Survival Technician has the responsibility of maintaining and servicing the cargo parachute assemblies.

A.2. Quality Assurance

CAUTION

In no case shall the Aviation Survival Technician perform their own quality assurance inspections.

The procedures detailed present a logical sequence for proper maintenance. Quality assurance steps are provided for critical operations. When a step is followed by **QA REQUIRED**, the Aviation Survival Technician shall perform the step and then have the authorized QA inspector perform the inspection.

A.3. Records

All aerial delivery systems shall be subjected to periodic inspections and maintenance. These tasks are the primary assurance of cargo parachutes functioning properly and no instance of carelessness or willful neglect shall be allowed to pass unnoticed. Mandatory Special Requirements (MSR) is used by the Aviation Survival Technician to provide a systematic means of control. The MSR Maintenance Procedure Cards (MPC) provide a logical sequence for inspection and maintenance of equipment. Additionally they provide a REMARKS section to denote any maintenance performed on equipment.

NOTE

The REMARKS section shall be used when any discrepancy is found and corrected if repairable. The information provided in this section is critical in determining equipment reliability, failure trends, and maintenance intervals.

Section B. Parachute Loft

B.1. Parachute Loft Introduction

The parachute loft is the work area designated for the maintenance of parachute assemblies, systems, and components. The parachute loft shall be large enough to accommodate parachute packing tables that are 45 feet by 36 inches by 36 inches. Other related parachute items may be necessary, and room for additional shops, such as survival equipment, protective clothing, and oxygen equipment, should be made available.

B.2. Parachute Loft Layout

The wet locker and washroom shall be separate areas. The packing area, storage facilities, and fabric areas should be separated if room is available. The packing tables shall be kept clean. All local fire regulations shall be adhered to.

CAUTION

All talc and mica powders shall be kept away from packing and fabric area to avoid contamination of parachute items.

- Wet Locker. The wet locker is used for drying parachutes and other equipment after washing. The following conditions shall be met.
  - Floor drains and environmental control equipment should be provided to maintain required environmental conditions.
  - The ceiling should be high enough to permit the parachutes to be hung full-length without touching the walls, floor, or other parachutes.
  - The wet locker shall not have windows or skylights.
  - If enough height is not available, the suspension lines shall be chained to prevent entanglement. The hoist lines shall be spaced at least 24 inches apart and at least 12 inches from the wall.
  - An adequate number of low-heat, flush type incandescent lighting fixtures shall be installed in wet locker walls and ceiling.
  - Drying racks shall be provided for parachute containers, AAECs, wet suits, etc.

- Washroom. The washroom is used for cleaning parachutes and other rescue and survival equipment. It shall contain a large wash tub and a large capacity industrial washer and dryer.

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B.2. Parachute Loft Layout (Continued)

- Storage Facilities. Parachute Loft storage facilities shall be designed to accommodate short or long term storage needs. The following conditions shall be met.
  - Bins and other storage facilities should be procured or constructed to accommodate packed and unpacked parachutes.
  - The facilities should consist of closed lockers or cupboards divided into compartments large enough to accommodate single Aerial Delivery System (ADS).
  - Open racks or shelves may be used as a substitute for closed lockers. The shelves should be designed to allow storage of a parachute or an ADS at least 4 inches from walls and 12 inches from the floor.
  - Storage facilities shall be well ventilated and free of dust and other contaminants such as oil, acid, and cleaning fluids.
  - Parachutes or an ADS shall not be stored directly over hot water pipes, heating apparatus, or in direct sunlight.

- Packing Area. The packing area is used for inspection, rigging, and packing of parachutes and related equipment.

- Fabric Area. All sewing, manufacturing, modifications, or repairs shall be performed in the fabric area. The fabric area shall be equipped with a cutting table, sewing machine, nylon searing machine, and necessary miscellaneous hand tools.

B.3. Environmental Conditions

Parachutes should be inspected, repaired, and packed under regulated temperature and humidity conditions. Accordingly, these conditions must be controlled in all parachute lofts. In general, the loft will not be excessively damp or dusty. It will be continuously or frequently ventilated.

B.3.a. Regulating Environmental Conditions

The ideal method for regulating air temperature and humidity is an air conditioner. To obtain the most effectiveness from the air conditioning, a continuous check will be made of the physical conditions of the loft.

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B.3.b. Temperature and Humidity

The temperature and relative humidity in the packing loft and dry locker will be maintained within limits indicated in figure 3-1. Ideal conditions are a temperature of 24 degrees Celsius (75 degrees Fahrenheit) and a relative humidity of 60 percent. The shaded area on the temperature-humidity chart, shown in figure 3-1, outlines the allowable environmental limits inside the parachute loft and illustrates favorable and unfavorable conditions. These limits are affected by two variables: relative humidity and temperature. Recordings of these variables shall be taken at least three times daily using the relative humidity and temperature indicator. Relative humidity and temperature indicator are available though commercial sources. This instrument will ensure that favorable conditions are being constantly maintained in the packing loft, storage, and dry locker areas.

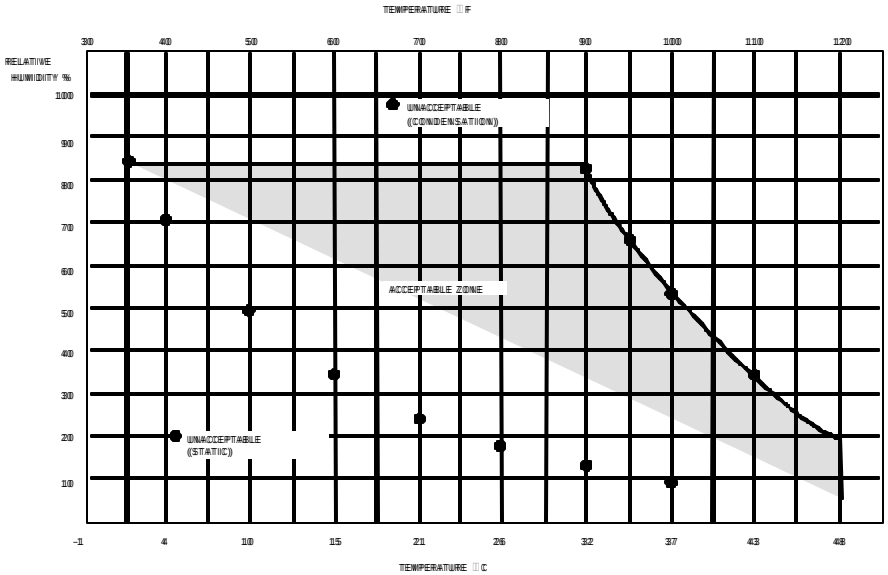

Figure 3-1 Temperature and Relative Humidity Limits

B.4. Lighting

The nylon material in parachutes is subject to deterioration by sunlight and some forms of artificial lighting. Avoid exposure of parachutes to sunlight; also avoid prolonged exposure over inspection lights. Lighting should be adequate and free of shadows. Fluorescent lighting is the most desirable for this purpose. However, parachutes should not be exposed to fluorescent lights closer than 5 feet for long periods of time. Keep parachutes under cover except when being inspected and/or worked on.

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B.5. Parachute Loft Personnel

Only graduates of Aviation Survival Technicians School (AST "A") shall be permitted to service or supervise the servicing of cargo parachute assemblies.

B.6. Parachute Loft Equipment

All parachute lofts are equipped to perform specific levels of maintenance procedures. These lofts should be equipped with the following equipment.

- Parachute Inspection Packing Table. The basic requirements of a packing table are that it be long enough to lay out the complete assembly for inspection and servicing (45 feet by 36 inches by 36 inches) and that it be smooth and free of slivers and burrs. Each packing table can be equipped with tension attachments and tension devices.

CAUTION

Packing tables shall not be used as cutting tables.

- Cutting Tables. Cutting tables are used for laying out and cutting cloth flat patterns. They are located in the fabric area and shall have clean, smooth surfaces. The fabric holder shall be located in the vicinity of the cutting table.

- Sewing Machines. Service manuals covering each class and variety of sewing machine are furnished with new machines. Replacement manuals may be ordered through open purchase from the sewing machine manufacturer. Servicing of all sewing machines shall be performed in accordance with the applicable sewing machine maintenance manual. Qualified Aviation Survival Technician shall perform operations and adjustments to sewing machines (a certified repair specialist may be contracted to perform maintenance).

- Small Tools and Equipment. A set of small tools and equipment is required for each packing table. Most tools and equipment are stowed in a drawer or container attached to the table. Tools and equipment shall be counted prior to and after rigging and packing a parachute.

Continued next page

B.7. Parachute Loft Safety Requirements

The following parachute loft working safety requirements shall be strictly adhered to at all times.

- Warning signs shall be clearly posted around equipment that is hazardous or requires special training or skills.
- Loft personnel shall not work at packing tables with objects in their shirt pockets or on belt loops.
- Brushes used to clean packing tabletops shall not be used on anything but the packing tabletop.
- Prior to use, inspect all parachute-packing tools for signs of corrosion, rough or sharp edges, and burrs. Tools shall be repaired, polished, and cleaned if any of these conditions exist.
- Parachute assemblies shall not be stacked on top of each other or on the floor, unless in suitable shipping containers.
- Parachutes or any component parts shall not be allowed to drag on the floor.
- During any one repack and inspection cycle, a parachute shall not be exposed to incandescent light or indirect sunlight for more than 36 hours. Exposure to direct sunlight should be avoided.
- Do not allow a parachute to come in contact with lighting fixtures or heat sources.
- Do not allow parachutes to become contaminated by talc or mica powders. Contamination of this type will weaken the fabric.
- Every precaution shall be taken to prevent soiling or contamination of parachute assemblies.
- Vehicles used to transport parachute assemblies shall be thoroughly cleaned, checked for contamination, and provided with suitable covers during inclement weather.
- To prevent hair and body oil contamination, do not place lines on hair, neck, or around body during whipping and folding procedures.

Section C. Aerial Delivery Systems

C.1. ADS Introduction

Aerial delivery systems utilized by the Coast Guard will be of a standardized size and configuration. Only Coast Guard fixed-wing standardization units are authorized to certify cargo drop equipment and configurations. Only configurations and equipment in this section are authorized for aerial deployment by Coast Guard aircraft. Aerial delivery systems are locally manufactured by following procedures on applicable ACMS build-up card.

C.2. ADS Weight Limitations

WARNING

Deviations from the following procedures and polices are not authorized.

Palleted cargo configurations are not authorized.

Only the ADS-CAN, polyurethane pump container, and the PAK 383 bulk cargo container may be used for aerial parachute delivery.

Only 12 and 28-foot diameter parachutes are approved for aerial delivery of cargo. Size of the canopy shall be determined by cargo weight.

NOTE

Any cargo weights below 40 pounds will be ballasted to bring weight to a 40-pound minimum.

Cargo Weight	Canopy Size
40 to 70 Pounds	12-foot canopy
70 to 250 Pounds	28-foot canopy
Over 250 Pounds	Not Authorized

Continued next page

C.3. ADS Configurations

The 28-foot and 12-foot aerial delivery systems consist of the following components.

- The 28-foot ADS is a combination of; two deployment containers, one containing a cargo parachute and the other 430 feet of trail line; a 10 or 15-foot static line connected to the trail line container, and a harness assembly with two snaphooks, one D-ring, and a 10-second delay cutting device.

- The 12-foot ADS is a combination of; one deployment container, containing both the cargo parachute and the 430 feet of trail line; and a 10 or 15-foot static line connected to the trail line container, and a harness assembly with two snaphooks, one D-ring, and a 10-second delay cutting device.

C.4. ADS Function

The Cargo Aerial Delivery System is designed to be used for air delivery of equipment from either C-130 or HU-25 aircraft. The static line is designed to provide the 15-foot length required for the C-130 or shortened to provide the 10-foot length used in the HU-25. The system, mounted on top of the drop equipment, is rigged in such a manner that when deployed, the trail line container is retained with the static line for retrieval. A 10-second delay cutter, mounted on the riser assembly, is required to release the parachute from the drop equipment to prevent the parachute from dragging the equipment with the wind after landing on the surface.

Section D. Aerial Delivery System Maintenance

D.1. ADS Maintenance

Maintenance of the ADS assemblies will consist of the following tasks:

- Inspection Intervals
- Contamination Inspection and Removal
- Cleaning of Parachute Assemblies

D.2. ADS Inspection Intervals

Inspection of the ADS assemblies will be in accordance with the applicable MSR MPC. The following are inspection intervals for the ADS assemblies:

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The 7-day inspection will be performed IAW procedures found in chapter 3, section D.2.a. No MPC sign-off is required for this inspection.
- The 180-day inspection will normally be performed at intervals not to exceed 180 days.
- A special inspection shall be performed whenever deemed necessary by the AST Shop supervisor.

D.2.a. ADS 7-Day Inspection

The 7-day inspection shall be performed on all in-service ADS assemblies either installed in aircraft or in ready issue status. This inspection is a visual in-place inspection with minimum requirements and shall be performed as follows:

Step	Action
1	Inspect container exterior and harness for fraying and contamination.
2	Inspect exterior for damage and corrosion.
3	Inspect for correct number and security of external tacking's.

Continued next page

D.2.b. ADS 180-Day Inspection

All cargo parachute assemblies will be inspected on a calendar basis in accordance with the appropriate MSR MPC, not to exceed 180 days.

D.2.c. ADS Special Inspection

A special inspection of ADS assemblies in storage or in service will be performed whenever conditions warrant. The AST shop supervisor, following review of the circumstances or conditions to which the ADS assembly has been subjected, will determine the extent of the special inspection. If another inspection is warranted the AST shop supervisor will direct the appropriate inspection, regardless of the last inspection date.

D.3. Contamination Inspection

All cargo parachute assemblies shall be inspected for the following types of contamination:

- Acid/Alkaline
- Salt Water
- Perspiration
- Fresh Water
- Mildew/Fungus
- Fire-Fighting Agent
- Petroleum Products
- Blood Stains
- Mud/Dirt/Sand/Trash

Continued next page

D.3.a. Acid/Alkaline Contamination Testing

Parachute assemblies suspected of acid or alkaline contamination shall be tested with pH test paper. A pH reading of 5.0 to 9.0 is in the safe zone. Readings below 5.0 indicate excess acidity, and readings above 9.0 indicate excess alkalinity. To test for excess acidity or alkalinity, proceed as follows:

Materials Required: - Distilled Water, NIIN 00-107-1510
pH Test Paper Kit, NIIN 00-420-0507

CAUTION

Ensure testing area is free of contaminates to avoid false readings or damage to the assembly.

Step	Action
1	Dampen suspected area with distilled water. **NOTE** Handle paper by one end only to prevent a false reading.
2	Place piece of full range paper (0.0 to 14.0 pH) on dampened area. A color change will indicate the approximate pH and which specific short range test paper to use.
3	Place short range paper indicated in step 2 on dampened area. The color change indicates the pH factor of the affected area. By matching test strip with applicable range color chart supplied with pH indicator kit, acid or alkaline strength can be determined.
4	**NOTE** If contamination is found, care must be used to prevent contact between the contaminated area and other portions of the assembly, as this could spread the damage. If acid contamination is found, go to chapter 3 section D.3.b. If alkaline contamination is found, go to chapter 3, section D.3.c.

Continued next page

D.3.b. Removing Acid Contamination

If acid contamination is found (IAW chapter 3, section D.3.a.), perform the following decontamination procedures.

Step	Action
1	The affected area shall be removed and replaced IAW applicable procedures in this chapter.
2	If non-load-bearing part of the container is acid stained (but not visibly degraded), the stained area shall be neutralized with ammonia water, rinsed, air-dried.
3	Retest affected area for pH level. If completely neutralized, return to service.

D.3.c. Removing Alkaline Contamination

If alkaline contamination is found (IAW chapter 3, section D.3.a.), perform the following decontamination procedures.

Step	Action
1	Rinse with cool, fresh water until a safe pH reading is attained.
2	Carefully inspect for deterioration.
3	Repair or replace any deteriorated portions IAW procedures in this chapter.

D.3.d. Removing Salt-Water Contamination

An ADS assembly that has been contaminated by salt water shall be cleaned (IAW chapter 3, section D.4) and inspected as soon as possible after contamination. Any portion of an ADS assembly which has been immersed in salt water for a period of more than 24 hours or cannot be cleaned within 36 hours after immersion shall be used for cargo drop practice only and not used as an operational cargo ADS assembly.

Continued next page

D.3.e. Removing Perspiration Contamination

If perspiration contamination is found, clean ADS IAW chapter 3, section D.3.c.

D.3.f. Removing Fresh-Water Contamination

Any ADS assembly that has been contaminated by fresh water or is damp shall be hung in the wet locker to dry. After drying, inspect for deterioration.

NOTE

Minor discoloration due to water immersion is allowable.

D.3.g. Removing Mildew or Fungus Contamination

If an ADS assembly is contaminated with mildew or fungus, proceed as follows:

Step	Action
1	Wash affected area with a mild soap and water solution.
2	Rinse affected area thoroughly with clean, fresh water.
3	Hang assembly by vent lines in a wet locker to dry.

D.3.h. Removing Firefighting Agent Contamination

If a parachute assembly is contaminated with firefighting agents, proceed as follows:

Step	Action
1	ADS assemblies exposed to “Light Water,” protein foam, PKP, and combinations thereof, shall be thoroughly washed within 30 hours after exposure. ADS assemblies exposed to firefighting chemicals and not washed within 30 hours shall be considered unserviceable.
2	Metallic parts that have been exposed to firefighting chemicals shall be disassembled, washed, dried, and examined. Metallic components treated in this manner may be returned to service, if undamaged.
3	Fabric parachute components exposed to soda acid discharge shall be removed from service and destroyed.

Continued next page

D.3.i. Removing Petroleum Products Contamination

Oil, grease, hydraulic fluid, and other petroleum stains shall be removed by repeated applications of mild soap and water solutions to the affected area. Each application shall be followed by a rinse in clean fresh water. Hang assemblies by vent lines in wet locker to dry.

D.3.j. Removing Biohazard Contamination

Removal of biohazard contamination shall be accomplished by spraying the contaminated area with Clean-Gear II then washing the canopy IAW applicable sections of this chapter.

D.3.k. Removing Non-Biohazard Contamination

Mud, dirt, sand, and trash shall be removed by hanging parachute at vent lines, allowing to dry, then shaking thoroughly. If necessary, brush lightly with soft brush. In exceptional cases it may be necessary to wash the entire assembly.

D.4. ADS Cleaning

Washing ADS parachute canopies removes the finish on the fabric, therefore, only wash them when necessary to avoid fabric deterioration. Two methods of cleaning are presented: hand washing and machine washing. Cleaning by hand should be attempted first. If hand washing does not clean the part, try machine washing.

D.5. ADS Cleaning, Support Equipment & Materials

The following are types of equipment and materials needed to clean ADS assemblies.

- Tub. A smooth bathtub or large deep sink is acceptable.
- Washing Machines. Tumble type washing machines shall be used. The washing machine must have a temperature control, gentle wash cycle, and rinse cycle.
- Clothes Dryers. Any tumble action dryer which can be controlled so that air temperature does not exceed 60 °C (140 °F).

CAUTION

Do not use forced-heat dryer.

- Mild soap (e.g. Ivory, Woolite) or soap solution and a water softener may be used.

Continued next page

D.6. Hand Washing

To hand wash an ADS assembly, proceed as follows:

NOTE

To reduce fabric deterioration, hard water may be softened with one tablespoon of sodium metaphosphate per gallon of water.

Step	Action
1	Wrap all metal fittings in heavy flannel cloth.
2	Immerse assembly in clean fresh water not to exceed 60 °C (140 °F). Gently move items by hand until all air pockets are removed.
3	Agitate by hand while water flows through and around fabric.
4	**CAUTION** *Do not wring canopy fabric.* After a short time (not to exceed 10 minutes) remove from tub and allow to drain as completely as possible.
5	After draining and rinsing tub, refill with water. Repeat steps 2 through 5 twice.
6	If a large tub is not available, hang assembly by canopy vent lines and spray clean, using clean, fresh water not to exceed 60 °C (140 °F).
7	**CAUTION** *Do not wring water from canopy.* Hang ADS assembly by canopy vent lines in a wet locker until dry. If ADS assembly is to be dried outdoors, refer to chapter 3, section D.8. or by machine drying, refer to chapter 3, section D.9.
8	When assembly is dry, remove flannel cloth from fittings.
9	Record reason and date of washing on applicable MSR MPC.

Continued next page

D.7. Machine Washing

To machine wash an ADS assembly, proceed as follows:

Step	Action
1	Wrap all metal fittings in heavy flannel cloth.
2	Gather suspension lines together and tie with cord every 3 ft. from the ends to the canopy skirt.
3	Place ADS canopy and suspension lines loosely in a large cloth mesh laundry bag.
4	If washing deployment bag, remove all rubber bands.
5	Add soap and water (water softener is necessary) prior to placing ADS assembly in washing machine.
6	Wash on gentle cycle.
7	Hang ADS assembly by canopy vent lines in a wet locker until dry. If ADS assembly is to be dried outdoors, refer to chapter 3, section D.8. or by machine drying, refer to chapter 3, section D.9.
8	Record reason and date of washing on applicable MSR MPC.

D.8. ADS Outdoor Drying

The ultraviolet rays of the sun will damage nylon and will ruin a canopy in a short time. Dyed fabric, such as international orange, deteriorates faster than the natural (white). The chart below demonstrates how the sun's rays rapidly deteriorate nylon. Tests indicate that once nylon is exposed to the sun, the damage is done; it will not regain its strength if then stored out of the sun.

Outdoors, summer sun	% Breaking strength in lbs. lost
7 Day's	52%
14 Day's	71%
21 Day's	94%

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D.8. ADS Outdoor Drying (Continued)

Ultraviolet damage is identified by a yellowish color when viewed in daylight and a white fluorescence when viewed by ultraviolet light. Dyed components are usually excessively faded.

Due to this deterioration of the canopy fabric, all units with access to wet lockers shall not dry ADS assemblies outdoors. Units that do not have access to wet lockers shall limit drying ADS assemblies to shaded areas only. Outdoor drying areas shall be set up so that no part of the ADS assembly will come in contact with the ground or side of a building.

D.9. Machine Drying

CAUTION

Ensure all rubber bands are removed from the ADS prior to machine drying.

If a machine drying facility is available, it may be used for drying ADS assemblies. Machine drying should be used only after 1 hour of drip-drying while suspended full length. No ADS components shall be left in the drier any longer than necessary to complete drying. Where indoor drying is available, ADS components should be removed from dryer while slightly damp and suspended for air-drying.

Section E. Aerial Delivery System Repairs

E.1. ADS Repairs Introduction

This section contains instructions for the repair of various components of ADS assemblies, to ensure appropriate items of equipment remain in ready for issue (RFI) status. All repairs shall be documented on the applicable MSR MPC.

E.2. ADS Repairs Criteria

The primary concern in repairing any assembly is ensuring that the basic structural integrity designed into the assembly is maintained.

E.3. ADS Repairs Procedures

When repairs detailed in this manual are performed, the following procedures will be observed.

- Supervisory personnel are responsible for determining if repairs may be performed locally or if the assembly should be condemned.
- The applicable parachute drawings and specifications shall be reviewed and followed.
- Extreme care shall be observed in removal or opening of seams to ensure no damage to material results.
- All repair work shall be carefully inspected and compared to drawings and specifications at completion of work to ensure conformity.
- A Quality Assurance (QA) inspector shall examine the finished work to ensure conformance with applicable drawings and specifications.

Continued next page

E.4. Determining ADS Component Repairability

CAUTION

The following instructions for repair apply only to Coast Guard cargo Aerial Delivery System.

NOTE

There are no limitations of service/total life for canopy repair materials.

An ADS component shall be considered beyond repair for any of the following reasons. Any component that is damaged beyond repair shall be destroyed locally.

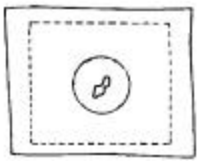
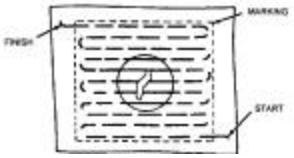
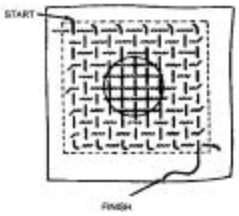
- One or more complete gore is torn
- Holes larger than 8 inches long in four or more panels.
- If more than 3 panels per canopy require replacement.
- Not more than 50 darned areas shall be permitted in any adjacent eight gores, and no more than 200 darned areas shall be permitted in any canopy.
- Severed suspension line.
- Ruptured or frayed suspension line(s) as described in chapter 3, section E.4.m.
- For training and operational ADS canopy suspension lines, one burn spot or hard spot per line is acceptable, provided the length is less than 1-inch and remains flexible at that point.
- Deployment bags and trail line bibs that have tears longer than 3 inches or holes larger than 1-inch.
- Deployment bags that have any wear, fraying, or damage to the webbing loop.
- Frayed riser assembly.

Continued next page

E.4.a. ADS Canopy Darning Procedures

Darn holes or tears that do not exceed ½ square inch using the following procedures.

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

Step	Action	Example
1	Mark a circle or square around area to be darned with marking pencil, clearing the damaged area by at least ¼-inch.	
2	Follow the procedures shown in the example, running back and forth with the fill of fabric within marked area.	
3	Follow the procedures shown in the example, running back and forth with the warp of fabric within marked area.	

E.4.b. ADS Canopy Restitching

Any loose, broken, or frayed stitching shall be restitched using the following procedures. There is no limit on the length of restitching or how many restitchings per canopy.

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-7807

NOTE

The sewing machines listed below depend on which area is to be restitched.

- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch
- 17W15 or equal sewing machine set up for 308 zigzag stitch

Continued next page

E.4.b. ADS Canopy Restitching (Continued)

The following is the continuation of the ADS canopy restitching procedures.

NOTE

A Cording Foot is required when stitching a radial seam next to a suspension line.

Step	Action
1	Restitch directly over loose, broken, or frayed stitching according to the original construction. Overstitch straight stitching by 1 ½inches. Overstitch zigzag stitching by ½inch.
2	After restitching near a radial seam (suspension line channel), slide the seam up and down on the suspension line to ensure the new stitching has not captured the line. If it has, remove the stitching and redo restitching.

E.4.c. ADS Canopy Radial Seam Repair

Holes, tears, or rips in the radial seam may be patched using the procedures provided below. If the damage extends through both sides of the radial seam, the patch will have to be made on both sides of the canopy. If the damage extends into the adjacent panel, the repair will be with a radial seam repair and a patch.

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- 1” Tape, Type II, MIL-T-6134
- Hot Knife
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

Step	Action
1	Lay canopy on table and anchor with shot bags.
2	Carefully trim the loose threads with scissors and sear the ragged edges with a hot knife (do not leave rough edges).
3	If the damage extends through the radial seam, match it back together and pin it in place.

Continued next page

E.4.c. ADS Canopy Radial Seam Repair (Continued)

The following is the continuation of the ADS canopy, radial seam repair procedures.

Step	Action
4	Place a piece of cellophane tape (Scotch Tape®) lengthwise on the middle of the seam, thus attaching the two seams.
5	Turn the canopy over.
6	Lay type II tape (MIL-T-6134) over the damaged area so as to overlap the damaged area by 2 inches with ½inch of the ends folded under.
7	Sew the two outside rows of stitching over the old stitching. Over stitch a minimum of 1-½inches past the tape. If temporary (cellophane) tape was used on the underside, remove it.
8	**NOTE** If damage extends through the radial seam, a similar patch shall be made on the opposite side of the first patch. If damage extends into the panel, a patch will have to be made using the procedures in E.4.e. With a cording foot on the sewing machine, sew the inside rows in the same manner as the outside rows in step 7.
9	After completing patch, slide the seam up and down on the suspension line to ensure the new stitching has not captured the line. If it has, remove the stitching and restitch.

E.4.d. ADS Canopy Vent/Skirt Hem Repair

Repairs on the vent and skirt hem are limited to patching ripped or fraying fabric. If the problem is one of abrasion to the fabric and the hem itself is not damaged, a repair may be made in the same manner as to a radial seam, see chapter 3, section E.4.c.

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- 1” Tape, Type II, Tubular MIL-W-5625
- Hot Knife
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

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E.4.d. ADS Canopy Vent/Skirt Hem Repair (Continued)

The following is the continuation of the ADS canopy vent/skirt hem repair procedures.

Step	Action
1	Lay canopy out on table, damaged side up. Smooth out area around the damage. Trim away the loose threads with scissors. Just barely sear the ragged edges with a hot knife to reduce further unraveling.
2	Cover damaged area with Tape, Type II, Tubular MIL-W-5625, with ½inch of the ends folded under.
3	Sew a box stitch 1/16-inch from the edge of the tape. Overstitch 1-½ inches.

E.4.e. ADS Canopy Patching

Any hole, cut, or tears 1-inch square or less shall be patched with a single patch. A severe thread separation or a thread separation with broken threads shall be patched using a single reinforcement patch. Holes, tears, or cuts larger than 1-inch square (up to 8 inches) shall be repaired using a double patch, one on the inside and one on the outside of the section. Any panel with holes, tears, or cuts larger than 8 inches shall be replaced IAW chapter 3, section E.4.i. Only two single or one double patch shall be installed on a single panel. If additional patches are required, replace the panel IAW chapter 3, section E.4.i. Examples of different patching methods are provided in Section E.4.j.

NOTE

If possible, anchor patch to at least one seam or hem. Single patches are sewn to the inside of the canopy.

E.4.f. ADS Canopy Thread Separation Repair

If a thread separation is not severe and no threads are broken, the threads can be pressed into place using a soft brush or pencil eraser. If damaged area is brushed in the wrong direction, separation will increase. If a thread separation is severe or there are broken threads, patch the separation using a single patch IAW chapter 3, section E.4.g.

Continued next page

E.4.g. ADS Canopy Single Patch Repair

A hole, tear, or cut less than 1 square inch or a thread separation shall be repaired with a single patch. To install a single patch, proceed as follows:

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- Cloth, Parachute, Pressure Sensitive MIL-T-43618
  or
  Cloth, Parachute, Nylon MIL-C-7020
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

NOTE

Single patches shall be installed on the inside of the canopy. This allows for future inspection for any continuing damage in that area.

Step	Action
1	Lay canopy inside out on a table.
2	Baseball-stitch cut or tears. Lock first and last stitch with overhand knot.
3	If a cut, tear, or hole has canopy material missing, trim edges and cut filler patch the same size and shape as the hole. Baseball stitch filler patch in hole. Lock first and last stitch with overhand knot.
4	Outline damaged area using soft lead pencil. Outline a minimum margin of 1-inch around a 1 to 3-inch hole; 1 ½ inches around a 3 to 6 inch hole; and 2 inches around a 6 to 8-inch hole.
5	**NOTE** If possible, anchor patch to at least one seam or hem. Place a piece of new material over the outlined area so that the weave of the new material matches the weave of the canopy. Cut a patch 1-inch larger than the outlined area.

Continued next page

E.4.g. ADS Canopy Single Patch Repair (Continued)

The following is the continuation of the ADS canopy single patch repair procedures for a hole, cut, or tear less than 1-inch square or a thread separation.

Step	Action
6	**NOTE** Single patches are sewn to the inside of the canopy. Place damaged area with inside facing up on a padded table or ironing board. Pin damaged area flat to eliminate wrinkles, and baste patch to outlined area. Raw edges of patch shall be turned under ½inch.
7	Lock stitch patch with 8 to 10 stitches per inch. Stitching around edge of patch shall be continuous. Upon completion of a row of stitches, backstitch 2 ½inches on radial seams or hems and 1 ¼ inches on diagonal seams. If patch is not anchored to seam or hem, backstitch 1 ¼ inches.

E.4.h. ADS Canopy Double Patch Repair

A hole, tear, or cut greater than 1-inch square and less than 8 inches square shall be patched with a double patch. To install a double patch, proceed as follows:

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- Cloth, Parachute, Pressure Sensitive MIL-T-43618
  or
  Cloth, Parachute, Nylon MIL-C-7020
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

Step	Action
1	For preliminary repair of cuts, tears, or missing material, repair in accordance with steps (1), (2), and (3) of chapter 3, section E.4.g.
2	Outline damaged area using soft lead pencil. Outline a minimum margin of 1-inch around a 1 to 3-inch hole; 1 ½inches around a 3 to 6-inch hole; and 2 inches around a 6 to 8-inch hole.

Continued next page

E.4.h. ADS Canopy Double Patch Repair (Continued)

The following is the continuation of the ADS canopy double patch repair procedures for a hole, cut, or tear greater than1-inch square and less than 8 inches square.

Step	Action
3	**NOTE** If possible, anchor patch to at least one seam or hem. Place a piece of new material over the outlined area so that the weave of the new material matches the weave of the canopy.
4	In order to cut outside patch, lay inside patch on a piece of new material and cut patch ¼-inch larger on all sides, except side or sides to be anchored to a seam or hem shall be cut to the same size as the inside patch.
5	Place damaged area with inside facing up on a padded table or ironing board.
6	Pin damaged area flat to eliminate wrinkles, and baste patch to outlined area. Raw edges of patch shall be turned under ½inch.
7	Lock stitch patch with 8 to 10 stitches per inch. Stitching around edge of patch shall be continuous. Upon completion of a row of stitches, backstitch 2 ½inches on radial seams or hems and 1 ¼ inches on diagonal seams. If patch is not anchored to seam or hem, backstitch 1 ¼ inches.
8	When applying outside patch, lay damaged area with outside facing up on a padded table or ironing board. Pin damaged area flat to eliminate wrinkles and baste directly over inside patch. Raw edges of patch shall be turned under ½inch.
9	Lock stitch patch using two rows of stitching around edges of patch at 8 to 10 stitches per inch. Stitching around edges of patch shall be continuous. Upon completion of a row of stitches, backstitch 2 ½inches on radial seams or hems and 1 ¼ inches on diagonal and drag surfaces.

Continued next page

E.4.i. ADS Canopy Complete Panel Replacement

Canopy panel replacements shall be performed as follows:

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- Cloth, Parachute, Nylon MIL-C-7020
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

NOTE

Use the boxes in the ripstop parachute cloth to line up the new and the old fabric exactly and duplicate the original installation. Panels may be replaced singly or in multiples.

Step	Action
1	Lay the canopy on a table inside out so that the complete gore may be spread and anchored.
2	Anchor the canopy with push pins on the adjacent panels and seams about 8 inches apart. **NOTE** The canopy may have to be stretched to make up for shrinkage caused by the thread take-up of the original stitching. Ensure all seams are straight and that the fabric is not distorted.
3	Lay the bolt of Cloth, Parachute, Nylon MIL-C-7020 over the panel to be replaced with the selvage edges over the diagonal seams.
4	Cut across the fill of the fabric leaving a 5-inch overhang over the radial seams.
5	Tuck the diagonal seam selvage edges under as much as the old seam, match up the ripstop boxes and pin, placing the pins about 1-inch apart.
6	On the radial seams, tuck under excess fabric as necessary; match up the boxes and pin in place. **NOTE** If the panel is adjacent to the skirt or vent hem, tuck under the excess fabric; match up the boxes and pin last.

Continued next page

E.4.i. ADS Canopy Complete Panel Replacement (Continued)

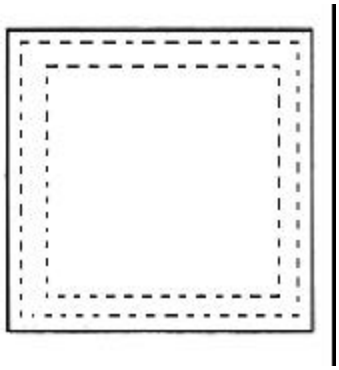
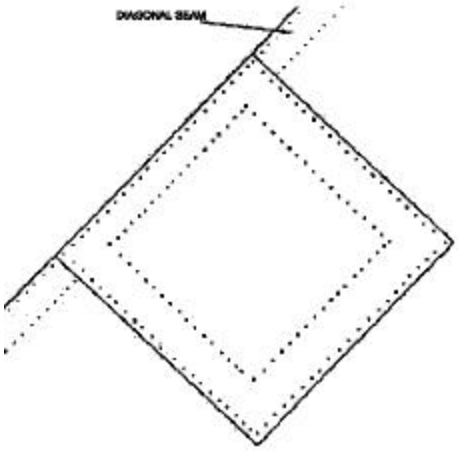
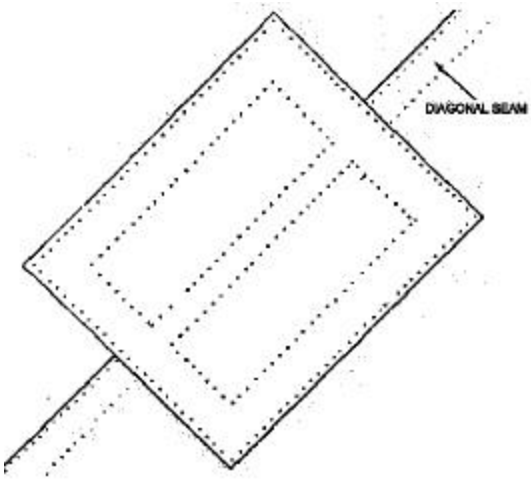
The following is the continuation of the ADS canopy panel replacement procedures.

Step	Action
7	Remove the pins one at a time and adjust the panel as required.
8	Pin the corners first and then halve the distance leaving an equal amount of fullness on each side. Continue to halve the distance and distribute the fullness until the pins are about 1-inch apart. **NOTE** This is very important. The tendency is to ignore the shrinkage and cut a panel to fit. Once sewn, it too shrinks and the resulting replaced panel is too small.
9	Machine sew one row of stitches around the outside of the new panel removing the panels as you go. **NOTE** Slight hand tension on the fabric will ensure a good stitch. Do not allow the fabric to bunch up. Do not allow the needle to catch the line in the radial seam.
10	Turn the canopy right side out and lay on table.
11	Using scissors, cut out the damaged panel leaving ½inch to fold under.
12	Make diagonal cuts at each corner.
13	If applicable, cut trim the excess of the patch on the radial seams and skirt or vent hem so that the raw edge will fall inside of the two new rows of stitching. Turn all edges under and pin in place.
14	With the canopy right side out, sew the inner row of stitching in the same manner as the outer row.
15	Slide the seam up and down on the suspension line to ensure the new stitching has not captured the line. If it has, remove the stitching and restitch.
16	**QA REQUIRED**

Continued next page

E.4.j. ADS Canopy Patch Examples

The table below provides a variety of ADS canopy patching examples.

Type	Example
Standard Patch	
Patch anchored to a diagonal seam	
Patch crossing a diagonal seam	

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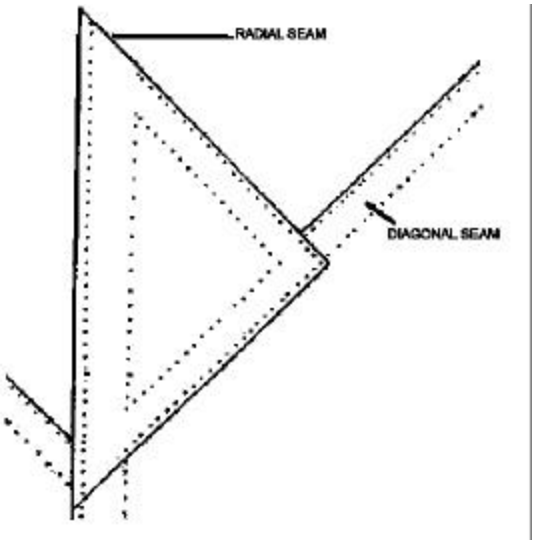
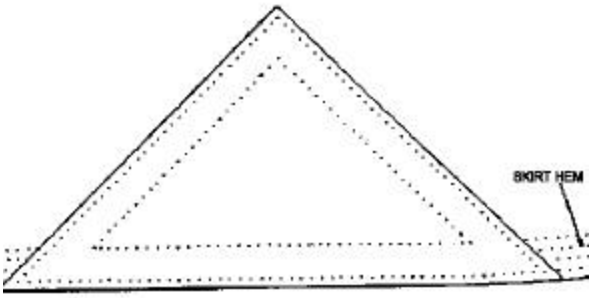
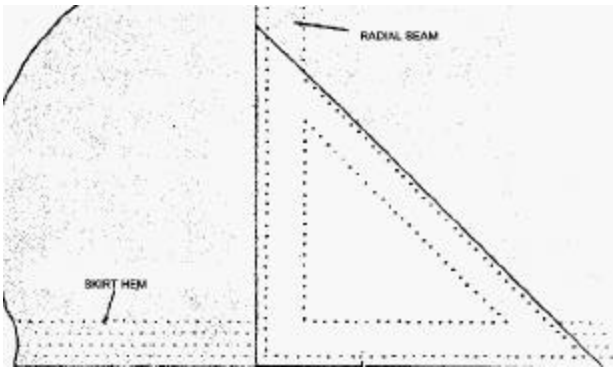
E.4.j. ADS Canopy Patch Examples (Continued)

The following is the continuation of the ADS canopy patching examples.

Type	Example
Patch that includes a radial seam and diagonal seam	
Patch that includes the skirt hem	
Patch that includes a skirt hem and radial seam	

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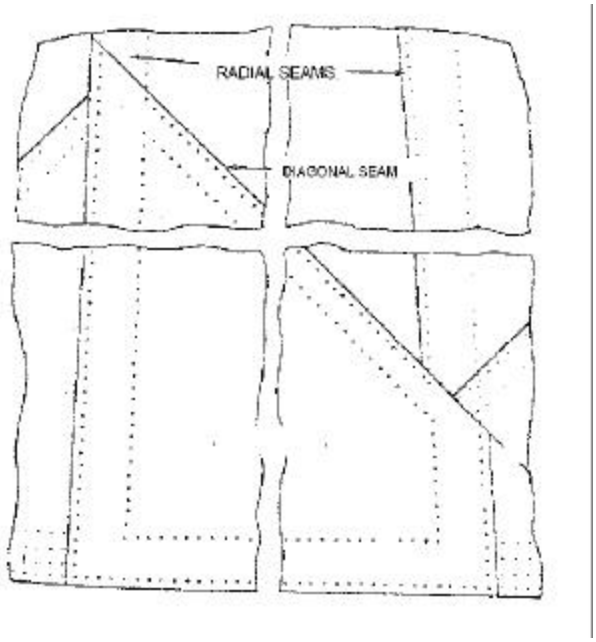
E.4.j. ADS Canopy Patch Examples (Continued)

The following is the continuation of the ADS canopy patching examples.

Type	Example
Panel replacement	

E.4.k. ADS Canopy Vent Ring Repair

If vent ring is broken, worn, or has lost elasticity, replace as follows:

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch
- Ring Canopy Vent P/N 60A113C35-1, NIIN 00-618-0286

Step	Action
1	Lay canopy out on packing table outside up and secure with shot bags.
2	Using a marking crayon, mark every inch across the seam containing the ring.

Continued next page

E.4.k. ADS Canopy Vent Ring Repair (Continued)

The following is the continuation of the ADS canopy vent ring replace procedures.

Step	Action
3	Open seam holding vent ring in vent hem.
4	Install new vent-ring and pin in place, matching up the crayon marks and old stitch holes.
5	Stitch seam, using size E, nylon thread, 8 to 10 stitches per inch. When seam is completed, over stitch 1 ¼ inches. **NOTE** Make only a few stitches at a time, removing the pins as you go, and make certain to line up the lines and previous stitch holes.
6	Inspect completed repair to ensure the new stitching has not captured the ring. If it has, remove the stitching and restitch.

E.4.l. ADS Connector Link Replacement

To replace connector links, proceed as follows:

Material Required:
- Connector Link MS22021-1
- Lacquer (Red), MIL-L-19537
- Toque Screwdriver, (capable of 50-Inch Pounds)

Step	Action
1	Remove yoke and plate assembly from connector link.
2	Remove connector link from lift web D-ring.
3	**CAUTION** *Ensure arrangement of suspension lines on connector links is not altered and loops on ends are not pulled apart during handling.* Slide suspension lines off connector link and onto a retractable ballpoint pen.

Continued next page

E.4.l. ADS Connector Link Replacement (Continued)

The following is the continuation of the replace connector links procedures.

Step	Action
4	**NOTE** Ensure knurled portions of connector link yoke and plate assemblies face up and screw heads face outboard. Slide suspension lines onto new connector link.
5	Slide connector link onto lifting web D-ring.
6	Attach and tighten yoke and plate assembly to a value of 20-25 inch-pounds. Apply tamper dot to connector link screw head using red lacquer. **QA REQUIRED** **QA:** Witness attachment of yoke and plate assembly.
7	Recheck suspension line continuity.

E.4.m. ADS Canopy Suspension Line Repair

To repair suspension lines, proceed as follows:

#	Type of Damage	Example	Action Required
1	Single thread or yarn material extending from sleeve.		Trim end flush with sleeve.
2	Minor weave separation to sleeve.		Gently massage weave to achieve normal thread orientation.
3	Rupture		If more than two ruptures per suspension line, replace entire canopy assembly.

Continued next page

E.4.m. ADS Canopy Suspension Line Repair (Continued)

The following is a continuation of the suspension line repair procedures.

#	Type of Damage	Example	Action Required
4	Two core ends protruding through sleeve.		Trim both ends flush with sleeve. If present, remove marker thread (utilized by manufacturer indication core splices).
5	Looped or pulled thread or yarn in sleeve.		Loops less than ½ in. need not be worked back into body of the sleeve. Work loops or pulled thread or yarn over ½ in. into sleeve by gently massaging sleeve to retract the thread or yarn.
6	Frayed sleeve.		Replace entire canopy assembly when yarn or frayed area is completely severed or inner core lines are visible.
7	Looped inner core line. No damage to sleeve.		Try corrective action as in #5

Continued next page

E.4.n. ADS Riser Repair

To repair harness/riser assemblies with loose or broken stitching, proceed as follows:

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- 31-15 or equal sewing machine set up for 301 lock stitch, 8 to 10 stitches per inch

Step	Action
1	Using size 6 nylon thread, lockstitch over original stitch and ¾inch on both sides. Uses 4 to 6 stitches per inch.
2	Trim excess thread.
3	Replace all loose, frayed, or broken tackings.

E.4.o. ADS Deployment Bag and Trail-Line Bib Riser Repair

To repair a deployment bag or trail-line bib, proceed as follows:

CAUTION

Condemn deployment bags that have any wear, fraying, or damage to the webbing loop.

Materials required:
- Nylon Thread, Size E, V-T-295, MIL-T-6134
- 31-15 or equal sewing machine set up for 301 lock stitch, 6 to 8 stitches per inch

- Repair loose, broken, or missing stitches using size E thread at 6 to 8 stitches per inch.

NOTE

Deployment bags and trail-line bibs that have tears longer than 3 inches or holes larger than 1-inch shall be condemned.

- Repair tears shorter than 3 inches IAW chapter 3, section E.4.g. step 2.

Continued next page

E.4.o. ADS Deployment Bag and Trail-Line Bib Riser Repair (Continued)

The following is a continuation of the deployment bag and trail line bib repair procedures.

- Repair holes 1-inch or smaller as follows:

Step	Action
1	Sear cut a piece of Type VIII nylon webbing that is ½ inch longer than the hole.
2	Sew the Type VIII nylon webbing over the effected area using size E thread at 6 to 8 stitches per inch.

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Section A. Survival Equipment and Survival Kits Overview

A.1. Introduction

This chapter contains information relating to survival equipment and survival kits. It is sectioned to reflect the different functions and equipment data.

A.2. Inspection Schedule

Survival equipment and survival kits shall be inspected in accordance with the phase cycle of the equipment in which the items are installed, unless stated otherwise. Individual personal issue equipment and survival kits shall be inspected at intervals not to exceed 180 days, unless stated otherwise. All equipment that has been immersed in water shall undergo a post-usage inspection.

A.3. Repair of Survival Equipment

Repair of survival equipment and survival kits are restricted to replacement of items that fail inspection, unless stated otherwise.

Section B. Survival Equipment

B.1. Survival Equipment Introduction

Survival equipment is intended to sustain life, assist in egress and facilitate detection by rescue personnel.

B.2. Water Storage Bag

The water storage bag is a plastic bag used for storing fresh water or for protecting miscellaneous items.

B.2. a. Water Storage Bag Configuration

The water storage bag (see figure 4-1) is constructed of strong transparent plastic, capable of holding 5 quarts of water. A buckle, snap fastener, and carrying strap are included with the bag so it may be attached to either personnel or equipment.

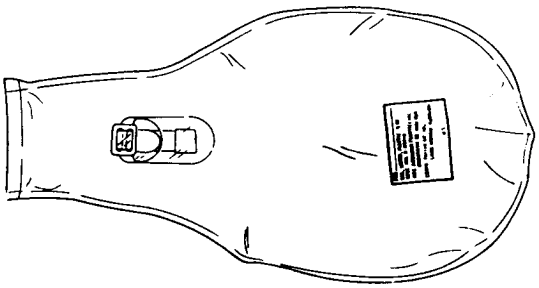


Figure 4-1 Water Storage Bag

B.2.b. Water Storage Bag Function

The water storage bag may be used for:

- Storing fresh water.
- Protecting miscellaneous items from salt-water exposure.
- When inflated and tied to another bag, the water bag may be used as a water wing for swimming.

B.3. Nylon Cord

Nylon cord is used primarily for attaching survival items but is also used as a survival item.

B.3.a. Nylon Cord Configuration

Nylon cord is supplied in 50-foot lengths of Type I parachute cord and has a breaking strength of 100 pounds.

Continued next page

B.3.b. Nylon Cord Function

Nylon cord is used to attach survival items after removal from the container. It may be used as a fishing line or snare, to construct fish nets, secure spring traps, tie down a wind break, construct a bow or sling, repair clothes, or fabricate a ladder.

B.4. Dye Marker

The dye marker is used to attract the attention of rescue aircraft.

B.4.a. Dye Marker Configuration

The dye marker (see figure 4-2) consists of a yellow, vinyl resin coated cloth pouch with an attaching tape. The dye medium is contained within the pouch.

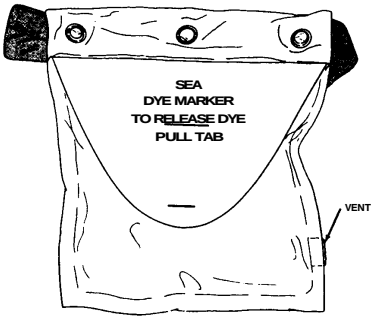


Figure 4-2 Dye Marker

B.4.b. Dye Marker Function

The dye marker may be attached to a life preserver, clothing, or other equipment. To open, grasp material at top of packet between fingers and palm of hand and tear pull-tab. If rapid dispersion is desired, agitate the packet of dye vigorously in the water. For best results, the dye marker should be used in calm to moderate seas only. Other effective uses of the dye marker are placing it in a stream/river or dragging it in the snow.

- Visibility:
  - Florescent green colored dye.
  - Visible at an approximate distance of 2 miles at 3000 feet altitude.

- Duration:
  - Dye marker (powder) is exhausted in 20 to 30 minutes.
  - Ceases to be a good target after 1 hour.

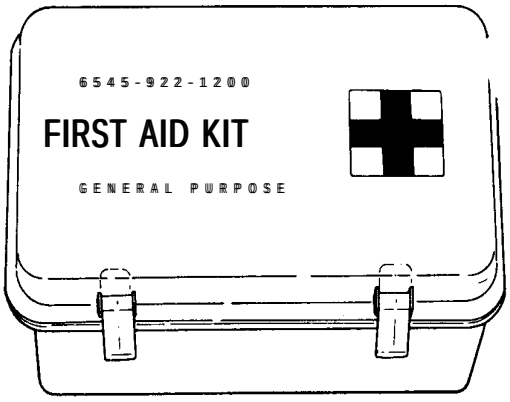
Continued next page

B.5. First Aid Kits

The first aid kits are used to prevent infection and to aid injured personnel under emergency conditions.

B.5.a. First Aid Kits Configuration

The first aid kits (see figure 4-3) contains medical supplies to prevent infection or to aid injured personnel. First aid kits or medical supplies may be included as part of a survival kit or mounted inside an aircraft.



Rigid

Aircraft Panel Mounted

Figure 4-3 First Aid Kits

B.5.b. First Aid Kit Function

The first aid kit is intended for use when medical assistance is required as a result of injury or infection. The contents are labeled for easy access and placed in individual packages.

Continued next page

B.5.c. First Aid Kit Inspection Intervals

The following are inspection intervals for first aid kits.

- First aid kits installed on aircraft shall be inspected every 24 months in accordance with ACMS MPC to assure availability of all listed components and that life limited items are replaced.

- First aid kits installed in life rafts and survival kits will be inspected on a calendar basis that normally coincides with the inspection interval of the raft or kit they are installed in.

B.6. Mylar® Space Blanket

The Mylar® Space blanket provides the aircrew member with warmth and protection. It may also be used for signaling.

B.6.a. Mylar® Space Blanket Configuration

The Mylar® Space blanket (see figure 4-4) is a lightweight, waterproof blanket made of aluminized plastic. The blanket is orange/silver and measures 96 inches by 56 inches.

Figure 4-4 Mylar® Space Blanket

B.6.b. Mylar® Space Blanket Function

The Mylar® Space blanket acts as a windbreak, sunshade, and poncho to provide the aircrew member with warmth and protection. The blanket furnishes some radar reflectivity over water and may be used for signaling as a position indicator.

B.7. Marine Reverse Osmosis Pump

The Marine Reverse Osmosis Pump (MROD, the “D” stands for device) is a simple hand operated water desalinator.

Continued next page

B.7.a. Marine Reverse Osmosis Pump Configuration

The type of MROD used by Coast Guard aviation is the Survivor™ 06 (see figure 4-5). The Survivor™ 06 has the capability of producing 6 gallons of water a day and is packed in the LRU-20/A aircrew life raft configuration and the F-2B wing life raft.

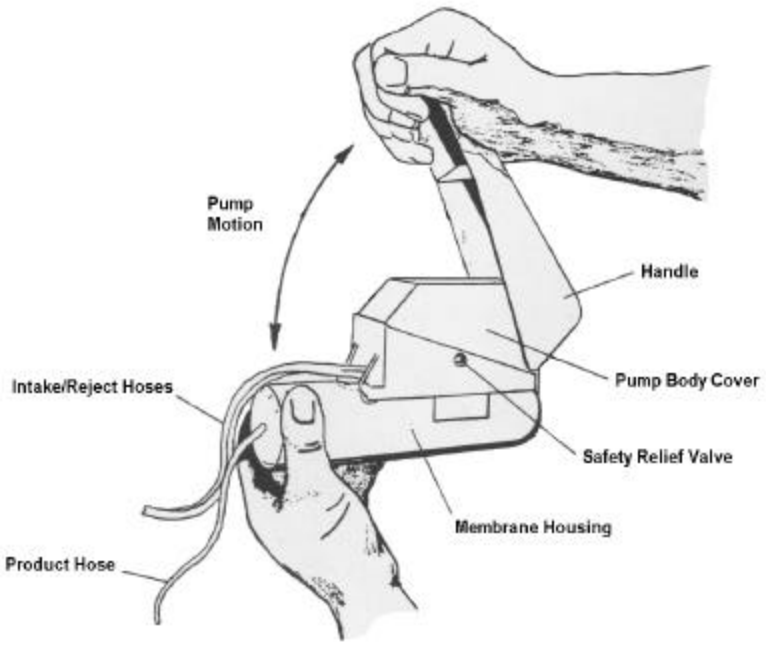


Figure 4-5 MROD

B.7.b. Marine Reverse Osmosis Pump Function

The operating procedures for the Survivor™ 06 MROD are as follows:

Step	Action
1	Using the hook and pile tape straps, strap the MROD to your leg with the Production Hose (see figure 4-5) pointed toward your knee.
2	Uncoil the intake/discharge hoses (they are connected together). Place the hoses and the attached strainer into the water. Be sure the strainer is fully submerged. See figure 4-5.
3	Place one hand on the pump handle and the other hand should grasp the bottom of the short membrane housing. Refer to figure 4-5.

Continued next page

B.7.b. Marine Reverse Osmosis Pump Function (Continued)

The following is the continuation of operating procedures for the Survivor™ 06 MROD.

Step	Action
4	Pump handle up and down as far as it will go in each direction at a comfortable speed. After approximately 1-2 minutes (30 - 40 strokes) you should see an orange band begin to extend from the membrane housing.
5	Once water begins to drip from the freshwater hose, pump an additional 2 minutes (60 - 80 strokes), while allowing the water to go overboard. This will give the preserving agents inside the membrane time to filter through. Then insert the freshwater hose into a water storage bag or directly into your mouth.
6	Continue pumping until you receive the desired amount of water. You will notice a slight salt flavor to the water. **CAUTION** *Do not drink water with a strong salt flavor.*

B.7.c. Marine Reverse Osmosis Pump Inspection Intervals

The following are inspection intervals for the Survivor™06.

- Acceptance: The Survivor™ 06 shall receive an acceptance inspection upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the applicable MSR MPC.

- Inspection: Survivor™ 06 installed in life rafts and survival kits shall be inspected in accordance with the MSR MPC on a calendar basis (every 180 days) that normally coincides with the inspection interval of the raft or kit they are installed in.

- Overhaul: The Survivor™ 06 shall require an overhaul inspection by the manufacturer every 6 years in accordance with the MSR MPC. Normally the overhaul will coincide with the inspection interval of the raft or kit they are installed in.

Continued next page

B.7.c. Marine Reverse Osmosis Pump Inspection Intervals (Continued)

NOTE

If the Survivor™ 06 is properly maintained during regular inspections, IAW MSR MPC, membrane replacement during the overhaul may be prolonged indefinitely.

B.7.d. Marine Reverse Osmosis Pump Repairs

Shop level repairs to the Survivor™ 06 are limited to those listed in the Marine Reverse Osmosis Pump MSR MPC. All other required repairs shall be performed by the manufacturer.

B.8. Emergency Drinking Water Packet

Packet drinking water is intended for use when no other clean water is available.

B.8.a. Emergency Drinking Water Packet Configuration

Packet water (see figure 4-6) contains 4 1/2 ounces of pure drinking water and may be carried in this ready to use state in all life raft packages.

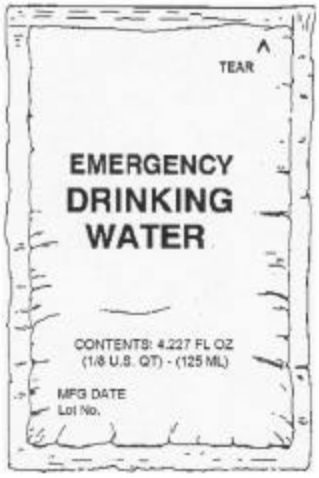


Figure 4-6 Emergency Drinking Water Packet

B.8.b. Emergency Drinking Water Packet Life Limit

Emergency water packet shall be removed from service or storage if the date stamped on the packet is more than 5 years old, or the date stamp is illegible. Additionally, emergency water packets shall be removed from a life raft/survival kit if the storage limit will expire prior to the next inspection.

Continued next page

B.9. Bailing Sponge

The bailing sponge is provided in all life rafts (except the LRU-18/C) to catch rainwater, bail a life raft, for personal hygiene, and as a fishing lure. The sponge is made from cellulose and comes in various sizes.

B.10. Penlight Flashlight

The penlight flashlight shall be procured locally for use by aircrew members. Only explosive-proof type penlight flashlights are authorized. Brand used shall be left to the discretion of the command.

B.11. Pocketknife

The pocketknife is a multi-purpose survival tool.

B.11.a. Pocketknife Configuration

The pocketknife (see figure 4-7) is constructed of stainless steel and consists of one blade, can opener, bottle opener, screwdriver, and leather punch blade.

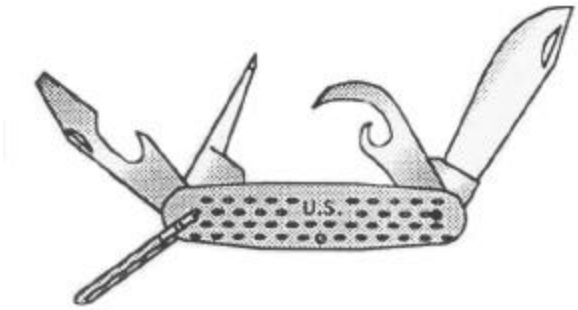


Figure 4-7 Pocketknife

B.11.b. Pocketknife Function

> **WARNING**
>
> Use caution when inspecting pocketknife to avoid injury and cuts. Great care should be taken when using the knife while in a life raft to prevent puncturing the raft fabric.

The pocketknife is intended to aid aircraft personnel in cutting wood or material, opening cans and bottles to prepare food, as a screwdriver, awl, and weapon if necessary.

Continued next page

B.12. Pocket Survival Tool

The pocket survival tool (i.e. Leatherman, Gerber) is a multi-function survival tool.

B.12.a. Pocket Survival Tool Configuration

The pocket survival tool is made of corrosion resistant stainless steel and has pliers, wire cutters, ruler, can/bottle opener, flat head and Phillips head screwdrivers, file, and a leather awl/punch. The pocket survival tool is carried in a leather or nylon sheath.

B.12.b. Pocket Survival Tool Function

The pocket survival tool is a multi-function survival tool that can be used for cutting wood and material, opening cans, and effecting emergency mechanical repairs. At all times the pocket survival tool should be kept clean, sharpened, and returned to the sheath when not in use.

B.12.c. Pocket Survival Tool Cleaning

Depending on what the pocket survival tool has been exposed to, clean the pocket survival tool using the following procedures.

Step	Action
1	If the pocket tool has been exposed to salt water or marine environments, thoroughly rinse in fresh water.
2	Debris or sticky substances have accumulated between the blades, the pocket survival tool may be cleaned in a mild solution of detergent and water.
3	Remove tar and similar substances, clean the pocket survival tool with turpentine or other mineral spirits. Do not use chlorine products.
4	After cleaning, dry the tool and apply light machine oil or a water-displacing product (Fluid Film) to force out moisture trapped in the joints.

Continued next page

B.12.d. Pocket Survival Tool Rust & Corrosion Removal

Rust and corrosion can occur in the absence of proper maintenance. The pocket survival tool should be cleaned, dried and re-oiled periodically to inhibit rust and corrosion. This is especially true if the pocket survival tool is used in a damp or marine environment.

Step	Action
1	Clean the pocket survival tool in accordance with chapter 4, section B.12.c.
2	Re-oil pivoting areas with a light machine or penetrating type oil (such as Fluid Film).
3	Buff stained surfaces with a polishing cloth or non-metallic abrasive (e.g., Scotchbrite pad or soft bristle brush).

B.12.e. Pocket Survival Tool Blade Sharpening

Pocket survival tools feature knife blades that may be straight-edged, serrated or both. Sharpening methods vary depending on the type of knife in the pocket survival tool. Straight-edged blades can be sharpened using the procedures in chapter 4, section B.14.d.

NOTE

Serrated edges should not be sharpened in the same manner as straight edges.

To sharpen a serrated blade, be sure to use a sharpening system specifically designed to accommodate serrated edges. A proper sharpening method will maintain the curvature of the serrations. Sharpen serrated blades only on the edged side; sharpening the flat (back) side of the knife will cause the serrations to wear away, reducing the knife's effectiveness.

B.13. Pocket Hook Blade Knife

The pocket hook blade knife (commonly called J-Hook Knife) is issued to rescue swimmers and personnel flying in aircraft with personnel parachutes.

Continued next page

B.13.a. Pocket Hook Blade Knife Configuration

The hook blade knife (see figure 4-8), is 6 inches long with the hook blade at one end and a plastic grip at the other end. The knife is stowed in its protective pocket when not in use.

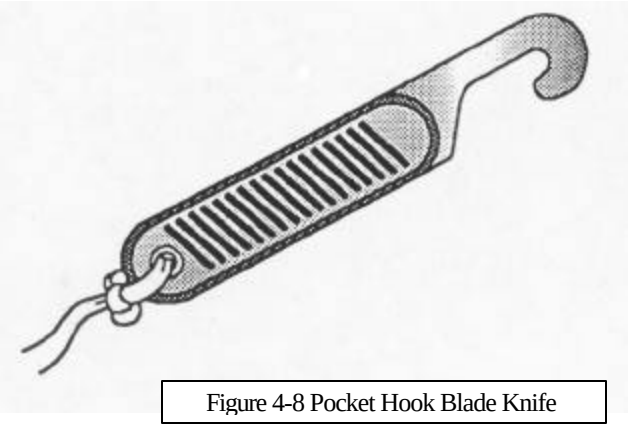


Figure 4-8 Pocket Hook Blade Knife

B.13.b. Pocket Hook Blade Knife Function

CAUTION

Use caution when inspecting pocketknife to avoid injury.

The pocket hook blade knife is intended for cutting parachute suspension lines, which may be entangled in trees or other obstacles.

B.14. Survival Knives and Sheath

NOTE

The only authorized survival knives are the Air Force Mark-1 Mod 0 and Navy Mark 3 Mod 0.

The Navy Mark 3 Mod 0 and Air Force Mark-1 Mod 0 survival knives with sheaths are multi-purpose survival tools.

B.14.a. Mark 3 Mod 0 Survival Knife and Sheath Configuration

The Mark 3 Mod 0 Survival Knife is a hunting knife with a 5-inch steel blade. One side of the blade is honed while the other side is serrated. The grip is made of a rugged plastic. The sheath is constructed of the same material as the knife handle and contains a self-sharpening feature installed.

Continued next page

B.14.b. Mark 1 Mod 0 Survival Knife and Sheath Configuration

The Mark 1 Mod 0 survival knife (see figure 4-9) is a hunting knife with a 5-inch steel blade. One side of the blade is honed while the other side is serrated. The grip is made of leather washers 1/8-inch thick, layered in a row up to the guard. At the end of the grip there is a steel butt. The sheath is constructed of leather with a pocket to carry the sharpening stone. There is a metal tip on the sheath to protect from injury.

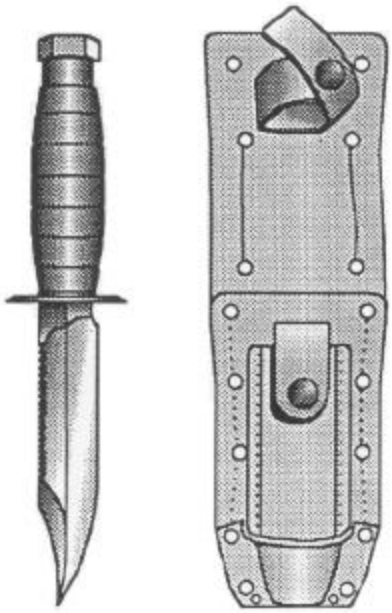


Figure 4-9 Survival Knife

B.14.c. Survival Knives and Sheaths Function

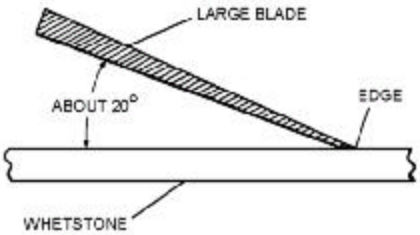
The survival knife is the most valuable general-purpose survival tool. It can be used for cutting wood and material, opening cans, and it is a hunting knife as well as a weapon. At all times the survival knife should be kept clean, sharpened, and returned to the sheath when not in use.

Continued next page

B.14.d. Sharpening the Survival Knife

To sharpen the survival knife proceed as follows:

Materials Required:
- Whetstone, Type I, P/N SS-S-736
- Lubricating Oil, General Purpose, VV-L-820
- Linen Cloth

Step	Action
1	Prepare whetstone by placing a few drops of oil on it.
2	Hold the blade edge so that the back of the blade is at a 20° angle from the surface of the stone. 
3	Use a circular motion and press lightly on the blade.
4	Turn the blade over and repeat step 3.
5	Wipe blade with linen cloth.

B.14.e. Installation of Sheath Protector on the Mark 1 Mod 0 Survival Knife

To prevent penetration of the sheath by the knife blade tip and resultant injury to the wearer, install metal tip on sheath as follows:

NOTE

All sheathed survival knives procured without or missing the metal reinforcement on the sheath shall be modified in accordance with the following procedures.

Materials Required:
- Kit Sheath Protector, P/N V66-1ACC-193
- Diagonal pliers
- 1/8 and 3/16 (or #12)-inch Drill bits
- Grommet and eyelet press w/11 pull-a-dot die

Continued next page

B.14.e. Installation of Sheath Protector on the Mark 1 Mod 0 Survival Knife (Continued)

The following is a continuation of the Mark 1 Mod 0 Survival Knife sheath metal tip installation procedures.

Step	Action
1	With a sharp knife or razor blade, cut 7/8-inch from the tip end of the sheath and discard. The cut should bisect the lower pair of rivets, which should be removed and discarded.
2	Remove and discard the pair of rivets adjacent to the bottom of the sharpening stone pocket. Diagonal pliers or equivalent can be used to raise the rivet points for easy removal from the leather.
3	Slip the metal tip over the end of the sheath. When properly installed, there shall be a smooth fit around the sharpening stone pocket.
4	Clear the four retaining rivet holes with a 1/8-inch drill bit, and install the four tubular rivets. **NOTE** The Carr grommet and eyelet press with the Pull-A-Dot die, number 11, may be used to set 1/8-inch tubular rivets.
5	With a 3/16-inch, or number 12-drill bit, clear the two holes for the bottom tie-down lace.

Continued next page

B.15. Push Button Release (PBR) Knife (Benchmade 9000SBT)

The PBR knife is the standard issue push button (automatic switchblade) type knife for rescue swimmers, which provides one-handed operation during rescues.

WARNING

The PBR knife shall be issued to rescue swimmers only. No person shall remove a PBR knife from Coast Guard facilities except while in the performance of operational rescue swimmer duties. Persons violating this regulation may be subjected to prison and/or fines under UCMJ, State and/or Federal weapons laws.

B.15.a. PBR Knife Configuration

The PBR knife (see figure 4-10) features a handle machined of solid 6061-T6 aluminum. After machining, the handles are bead-blasted, to provide a sure grip, and then hard anodized for maximum protection against the elements. The blade is ground from high carbon ATS-34 stainless steel, the blade also features a ComboEdge™ serration pattern, which is particularly well suited for cutting fibrous materials like rope or nylon webbing.

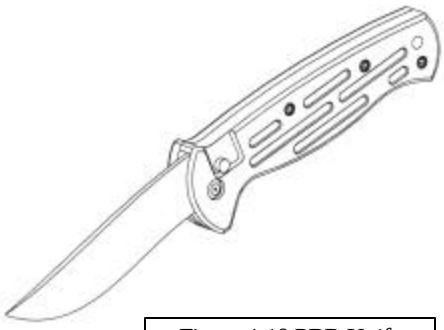


Figure 4-10 PBR Knife

B.15.b. PBR Knife Function

The PBR knife provides rescue swimmers with a rapid means to cut fibrous materials. The PBR's automatic opening mechanism allows for rapid deployment, even with gloves or under water, yet still allows the knife to be easily closed with one hand and safely returned to the storage pocket.

Continued next page

B.15.c. PBR Knife Inspections

The PBR knife shall be inspected in accordance with the procedures provided in the Tri-SAR MSR MPC.

B.15.d. PBR Knife Sharpening

The PBR knife shall be sharpened in accordance with the procedures provided in chapter 4, section B.14.d. To sharpen a serrated blade, be sure to use a sharpening system specifically designed to accommodate serrated edges. A proper sharpening method will maintain the curvature of the serration's. Sharpen serrated blades only on the edged side; sharpening the flat (back) side of the knife will cause the serration's to wear away, reducing the knife's effectiveness.

B.16. Chemical Light

The chemical light is a foil-wrapped plastic wand, which emits a chemically activated light during nighttime rescue operations.

B.16.a. Chemical Light Configuration

There are two types of chemical lights (see figure 4-11) available for general survival and signaling applications:

- 4-inch green/yellow chemical light (6 hour duration)
- 6-inch green/yellow chemical light (12 hour duration)

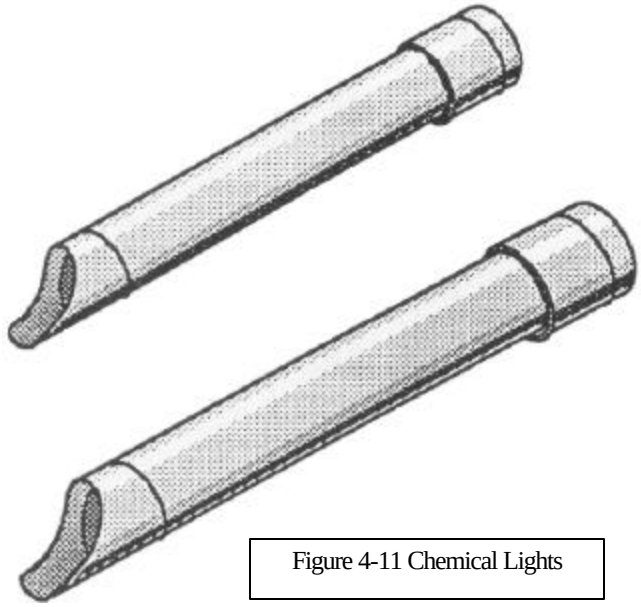


Figure 4-11 Chemical Lights

Continued next page

B.16.b. Chemical Light Function

The chemical lights are used to provide a visual reference for the hoist hook and rescue equipment during nighttime hoisting evolutions. Remove from foil package, bend plastic tube until an audible snap is heard, then shake vigorously.

B.16.c. Chemical Light Shelf Life

The chemical light shall be inspected prior to placing in service and at intervals not to exceed 90 days thereafter.

B.17. Distress Marker Lights

The distress marker lights are battery-operated strobe lights used to signal rescuers. The following is a list of the authorized distress marker lights:

- CG-1
- FireFly II
- SDU-5/E

B.17.a. Distress Marker Lights Configurations

The CG-1 and FireFly II distress marker lights are lightweight, compact, battery operated, portable units with all circuitry encapsulated within the case. The case is fabricated of high impact resistant thermoplastic material with provisions in the bottom end for receiving the AA batteries. The battery entry and the case are completely watertight when the battery is installed in place. The case is also provided with a sliding ON/OFF type switch to permit one hand operation.

The SDU-5/E distress marker lights are lightweight, compact, battery operated, portable units with all circuitry encapsulated within the case. The case is fabricated of high impact resistant thermoplastic material with provisions in the bottom end for receiving a lithium battery. The battery entry and the case are completely watertight when the battery is installed in place. The case is also provided with a push button ON/OFF type switch to permit one hand operation.

Continued next page

B.17.b. Distress Marker Lights Function

The distress marker lights are intended for equipping aircrew members with a high-intensity visual distress signal in the event of abandonment of aircraft.

- CG-1:
  - Light Output: 100,000 peak lumens per flash
  - Flash Rate: 60 +/- 10 flashes per minute
  - Visibility: 5 miles minimum
  - Duration: 9 hours continuous; 18 hours intermittent
- FireFly II:
  - Light Output: 150,000 peak lumens per flash
  - Flash Rate: 60 +/- 10 flashes per minute
  - Visibility: 3 miles minimum
  - Duration: 8 hours continuous; 16 hours intermittent
- SDU-5/E:
  - Light Output: 100,000 peak lumens per flash
  - Flash Rate: 50 +/- 10 flashes per minute
  - Visibility: 5 miles minimum
  - Duration: 9 hours continuous; 18 hours intermittent

B.17.c. Distress Marker Lights Modifications

To provide attachment capability of the distress marker light to an aircrew member's helmet, add hook and pile tape to the light as follows:

Materials required:
- Fastener Tape, Hook 2-inch (either non-self adhesive or self-adhesive)
- Adhesive EC-2141

Step	Action
1	Cut a 1 ½x 3-inch piece of hook tape.
2	Position tape on either flat side of the light and cement.

B.18. Survivor Locator Light

The survivor locator light is a saltwater activated unit used to signal SAR aircraft.

Continued next page

B.18.a. Survivor Locator Light Configuration

The survivor locator light (see figure 4-12) is a small compact unit consisting of a lens, connector wire, and a saltwater activated battery. The TSO-C85 light emits a high intensity light visible for many miles and has an operating life of 8 continuous hours.

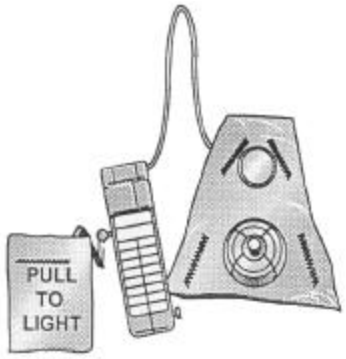


Figure 4-12 Survivor Locator Light

B.18.b. Survivor Locator Light Function

Survivor locator lights are installed on the LPP-1A life preserver and LRU-20/A life raft. The battery pack hangs below the light to ensure contact with water. When activated, a high intensity light is emitted to attract attention of SAR aircraft, ships, or ground rescue parties.

B.19. Emergency Signal Mirror

The emergency signal mirror is used to attract rescue ships or aircraft.

B.19.a. Emergency Signal Mirror Configuration

The emergency signal mirror (see figure 4-13) is made of acrylic plastic and is 2 x3 inches. There is a hole in the corner of the mirror through which a lanyard passes so that the mirror may be looped around the neck.

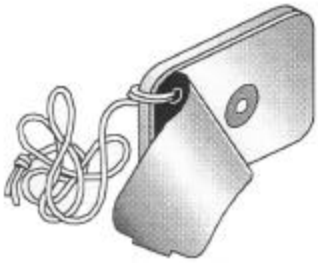


Figure 4-13 Emergency Signal Mirror

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B.19.b. Emergency Signal Mirror Function

The emergency signal mirror is intended to reflect sunlight at passing ships, aircraft, or rescue parties. When used on a bright sunny day the emergency signaling mirror has a reflective glare of 8 million-candle power (visible up to 40 miles). Instructions for using the mirror are printed on its back.

B.20. Sunburn Preventive

Sunburn preventive is a liquid cream used for protection against sunburn. It will have a minimum SPF of 30.

> **WARNING**
>
> Sunscreen contains P-aminobenzoic acid (PABA). Personnel sensitive to PABA or related compounds should avoid use.

B.20.a. Sunburn Preventive Configuration

Sunburn preventive is packaged in a plastic squeeze container.

> **NOTE**
>
> Sunburn preventive containers may leak. To prevent leakage, secure lid with two layers of electrical tape with a tab for removal.

B.21. Signaling Whistle (Fox 40)

The Fox 40 signaling whistle emits an audible signal to rescue ships and personnel.

B.21.a. Signaling Whistle (Fox 40) Configuration

The signaling whistle (see figure 4-14) has no moving parts and is made of plastic with a lanyard attached for easy access and to prevent loss.

Figure 4-14 Fox 40 Whistle

Continued next page

B.21.b. Signaling Whistle (Fox 40) Function

The whistle is used for attracting attention of rescue ships or personnel in foggy weather or at night. Whistle range is 1,000 yards.

B.22. Meals Ready to Eat (MREs)

Meals Ready to Eat (MREs) are found on the C-130 as a supplemental crew meal when no other meal was provided, due to short notice flights or extended patrol flight hours. Meals Ready to Eat are also packed in the ASRK-18 and other survival kits.

B.22.a. Meals Ready to Eat (MREs) Configuration

Meals Ready to Eat is available in 12 different menus per case. MREs are a complete meal that consists of a main course, powdered drink, dessert, and condiments.

B.22.b. Meals Ready to Eat (MREs) Function

Meals Ready to Eat provide a complete nutritious meal that covers three of the four food groups; meat/fish, vegetable/fruit, and bread, sometimes the dairy group is represented with a candy bar of various type. Although Meals Ready to Eat do not require any cooking or further preparation prior to you consuming it, they do come with salt, pepper, and occasionally hot sauce, so that you can flavor the meal to your taste.

NOTE

Humans can survive longer without food than water. MREs require large amounts of water to re-hydrate, so if water is scarce save it for drinking. Eating non-rehydrated MREs will cause severe stomach cramps.

B.23. Abandon Ship Rations

Abandon ship ration packets consist of candy and gum contained in a foil coated plastic bag. These rations provide quick energy to personnel in emergencies when no other food is available.

B.24. Life Raft Hand Pump

A hand pump is used to inflate portions of life rafts by hand.

Continued next page

B.24.a. Life Raft Hand Pump Configuration

Hand pumps used in Coast Guard aviation may be the barrel type hand pump used in the F-2B wing raft or the commercially procured accordion type.

NOTE

Prior to installing a hand pump in a life raft, check to ensure pump attaches to life raft inflation valve.

B.24.b. Life Raft Hand Pump Function

The hand pump is used to inflate inflatable floor, and other compartments not inflated by the life raft inflation assembly. The pump is also used to top-off an inflated raft or maintain inflation of a leaky raft.

B.25. Mechanical Patch

The mechanical patch is a device for temporarily sealing a hole in a life raft.

B.25.a. Mechanical Patch Configuration

The mechanical patch (see figure 4-15) consists of two alloy plates. The bottom plate is fitted with a hinge and a rubber gasket, which seals between the life raft fabric and cover plate. A wing nut holds the patch in place. A handle, which facilitates positioning the patch and a nylon cord, which prevents loss, are also attached.

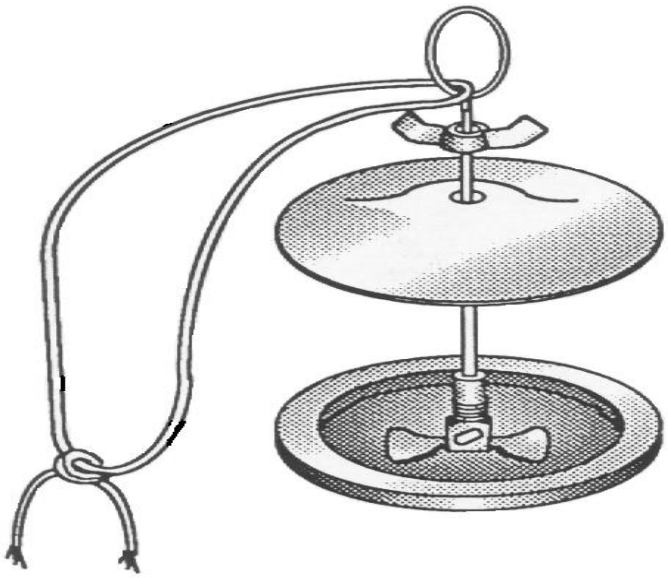

Figure 4-15 Mechanical Patch

Continued next page

B.25.b. Mechanical Patch Operation

The following are operating procedures for the mechanical patch.

Step	Action
1	Loop cord around wrist to prevent loss of mechanical patch.
2	Dip mechanical patch in water to facilitate insertion.
3	Push base through hole in fabric. If hole is too small, carefully enlarge so base can be forced through.
4	Pull base back against inner fabric surface and slide cover over screw and against outer fabric surface.
5	Adjust mechanical patch to cover hole completely and hold it in place.
6	Screw down wing nut firmly.

B.26. Pyrotechnic Allowances, Storage Safety, and Operation

Refer to Ordnance Manual, COMDTINST M8000.2 (series) for MK-124 MOD-0 and MK-79 MOD-0 allowances, storage, and safety precautions. Operational procedures can be found in the NAVAIR 11-15-7, Pyrotechnics, Screening, Marking, and Countermeasure Devices.

B.27. MK-124 MOD-0 Signal Flare

The MK-124 MOD-0 signal flare is intended to attract the attention of SAR aircraft, ships, and ground rescue parties. The signal may also be used to indicate wind direction to helicopters performing pickup of downed aircrew members.

Continued next page

B.27.a. MK-124 MOD-0 Signal Flare Configuration

The MK-124 MOD-0 signal flare (see figure 4-16) is a dual-purpose day or night distress signal with the following distinguishable characteristics.

- Night End:
  - Two ridges that encircle the signal
  - White ignition lever
  - Red inscription “Night Use Flare End”
  - 3600 candlepower red flame
  - 20-second duration
  - Visible up to 8 miles

- Day End:
  - Red ignition lever
  - Orange inscription “Day Use Smoke End”
  - Orange Smoke
  - 20-second duration
  - Visible up to ½mile

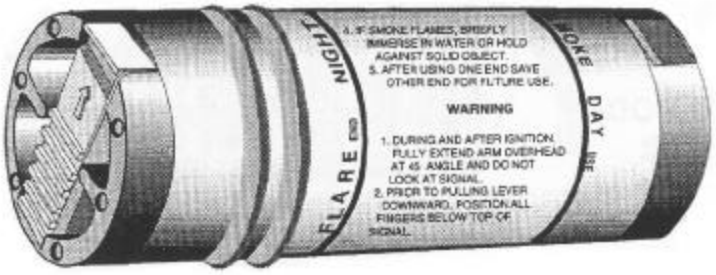

Figure 4-16 MK-124 MOD-0

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B.28. MK-79 MOD-0 Signal Kit

The MK-79 MOD-0 signal kit is intended to attract the attention of SAR aircraft, ships, and ground rescue parties.

B.28.a. MK-79 MOD-0 Signal Kit Configuration

The MK-79 MOD-0 signal kit (see figure 4-17) has the following distinguishable characteristics.

- One MK-31 Projector (gun)
- Seven MK-80 Flare Cartridges
- Fires a red pyrotechnic star
- 12,000 candlepower
- Reaches height of 250 – 650 feet
- 4.5 second duration
- Visible up to ¾mile during daylight and 10 miles at night

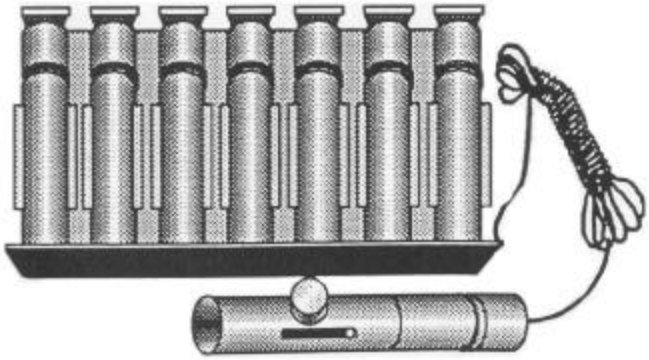

Figure 4-17 MK-79 MOD-0

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B.29. SILVA Landmark Type 27 Compass

The Landmark Type 27 Compass is intended for the use of downed aircrew personnel and shall be stowed in the life rafts and survival kits (as required by the applicable MSR MPCs).

B.29.a. SILVA Landmark Type 27 Compass Configuration

The Type 27 compass (see figure 4-18) is primarily a hand held compass encased in a clam shell type case to give it greater protection. A unique feature of the compass is that it can be pinned to the clothing to provide for hands-free use. It is a liquid filled precision compass. It includes a sighting mirror, clear protractor base plate, a sapphire jeweled bearing and a steel needle. The compass is 1 5/8 inches X 2 5/16 inches and weighs 1 ounce.

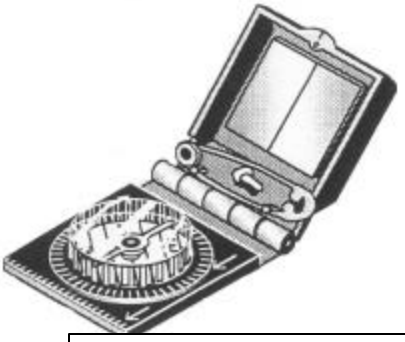

Figure 4-18 SILVA Compass

NOTE

The SILVA Landmark Type 27 Compass will be introduced into the Navy supply system by attrition as stocks of Magnetic Wrist Compass are depleted.

B.29.b. SILVA Landmark Type 27 Compass Function

The Landmark Type 27 Compass is primarily for vectoring aircraft and navigational purposes. It can be used to take bearings from maps as well as line of sight. In addition to being a vectoring and navigational aid, the Type 27 compass can be used to locate iron-base stones (lodestone). (Striking flint, quartz, or sandstone with a lodestone can be used to start a fire.)

B.29.c. SILVA Landmark Type 27 Compass Inspection

Inspection of the SILVA Landmark Type 27 Compass shall consist of a visual inspection coinciding with the inspection schedule of the kit or assembly (life raft, survival kit) in which it is stowed.

it is stowed.

Continued next page

B.30. Helicopter Emergency Egress Device III (HEED III)

The HEED III is designed to give aircrews additional egress time in the event of helicopter ditching. The HEED III is installed in all the LPU-26/PE survival vests and the Rescue Swimmer HEED Belt. Only trained personnel will use the HEED III.

B.30.a. HEED III Configuration

- The HEED III assembly (see figure 4-19) consists of a 2 ¼ inch diameter high-pressure cylinder mounted to a single stage pressure demand regulator. The HEED III contains compressed air serviced to 3,000 PSI.

WARNING

All operational HEED cylinders shall be lime green. Training HEED cylinders shall be orange. Training devices shall not be used operationally.

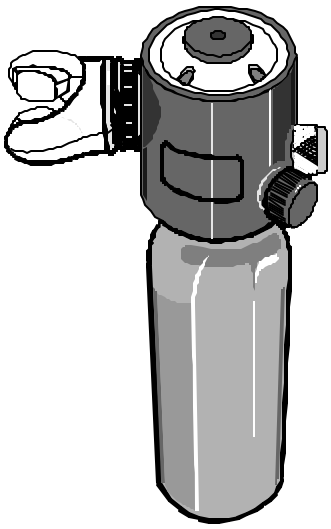

Figure 4-19 HEED III

B.30.b. HEED III Function

The HEED III is always in the "on" position. By placing the HEED III in your mouth and inhaling, you are able to breathe normally.

Continued next page

B.30.c. HEED III Inspection Intervals

The following are inspection intervals for an operational HEED III.

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the applicable MSR MPC.

- Inspection/Clean and Disinfect: An Inspection/Clean and Disinfect shall not exceed 180-day intervals. This inspection shall be in accordance with the applicable MSR MPC.

- Regulator Reconditioning/Adjustment Hydrostatic Test: A Regulator Reconditioning/Adjustment and Hydrostatic test are not to exceed 5 years from the date stamped on the cylinder. This inspection shall be in accordance with the applicable MSR MPC.

B.30.d. HEED III Post Training Usage Inspection

Training HEED III assemblies shall be cleaned and inspected in accordance with the following procedures.

NOTE

The post training usage inspection requires the use of the HEED MSR MPC, but enrollment into MSR system is not required.

Step	Action
1	Service HEED III to 3000 PSI.
2	Invert the device (regulator down) and purge the device.
3	After purging all air pressure, remove the regulator.
4	Soak the cylinder in a one to one solution of hot water and vinegar for 30 minutes. Rinse the interior of the bottle with clean tap water.
5	Rinse cylinder with fresh tap water, and dry with lint free towels (P/N UU-T-595).
6	Set cylinder in an inverted position and allow interior of cylinder to thoroughly dry.
7	Perform a buildup and Inspection/Clean and Disinfect Inspection IAW MSR MPC 256141.0, then place the assembly in storage charged to a minimum of 100 PSI.

Continued next page

B.30.e. Disinfecting Training HEED IIIs

To protect individuals from potential infections, HEED IIIs used during training shall be disinfected after each trainee usage using the following procedure.

Materials Required:
- CLEAN-GEAR II, P/N CG747 (Georgia Steel and Chemical Co. 1-800-296-0351)
- Lint Free Towels, P/N UU-T-595

Step	Action
1	Rinse HEED III mouthpiece with clean tap water.
2	Spray the HEED III mouthpiece with CLEAN-GEAR II, using a lint free towel (P/N UU-T-595) wipe the mouthpiece to ensure all areas are covered.
3	Allow mouthpiece to air dry for 10 to 15 minutes.

Continued next page

B.31. R/S HEED III Belt

The R/S HEED III Belt provides rescue swimmers with a HEED III while wearing a water deployment ensemble.

B.31.a. R/S HEED III Belt Configuration

The R/S HEED III Belt (see figure 4-20) consists of a webbing belt and holster, a quick release "Fast Tech" buckle, and a HEED III cylinder. The HEED III cylinder is tethered to the holster by a length of type II webbing and secured with a 50-lb. weak link.

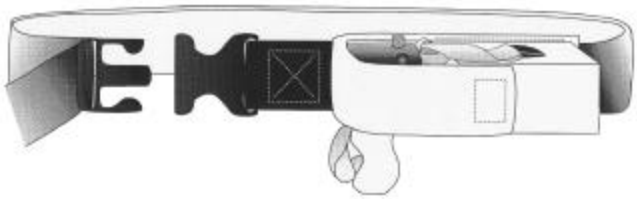

Figure 4-20 R/S HEED III Belt

B.31.b. R/S HEED III Belt Function

The R/S HEED III belt shall be worn at the waist, with the HEED III holster positioned near the left hip. Wearing the belt in this manner ensures the location of the HEED III is consistent whether wearing the LPU-26/PE or R/S HEED III Belt.

B.31.c. R/S HEED III Belt Inspection Intervals

The following are inspection intervals for the R/S HEED III Belt.

- Acceptance: The R/S HEED III Belt will receive an acceptance inspection before being placed into service. This inspection will be in accordance with the applicable MSR MPC.

- Inspection: The R/S HEED III Belt Inspection shall not exceed 180-day intervals. This inspection shall be in accordance with the applicable MSR MPC.

- HEED III Inspections: The HEED III carried in the HEED Belt shall be inspected in accordance with chapter 4, section B.30.c.

- HEED III Preflight Inspections: HEED III Pre-flight inspections shall be performed in accordance with chapter 2, section L.4.

- HEED III Postflight Inspections: HEED III Post-flight inspections shall be performed in accordance with chapter 2, section L.5.

Continued next page

B.32. AN/PRC90 and AN/PRC90-2 Survival Radios Overview

The survival radios used in Coast Guard aviation are the AN/PRC90 and AN/PRC90-2 radios. These radios have the following common physical and operating characteristics.

- They are dual-channel, battery powered, personal survival transceivers.
- They are used for two-way voice communications between downed aircrew members and rescue assets.
- The rugged, water tight, aluminum case protects the internal circuits from water damage to a depth of 50 feet.
- The battery compartment also has water tight integrity features to permit changing of the battery during adverse weather conditions without damaging any circuits.
- They are equipped with a miniature earphone, which permits quiet operation during high wind noise.
- Operate two-way voice communication on 243.0 MHz and 282.8 MHz, and a beacon on 243.0 MHz.
- Both radios will provide approximately 6 to 8 hours of use when operated with a fully charged battery. When using the Morse Code feature on the AN/PRC90 this operating time can be increased several hours. However, using beacon power booster on the AN/PRC90-2 will reduce this operating time.

B.32.a. AN/PRC90 and AN/PRC90-2 Survival Radio Custody

Air station Survival Shops shall maintain custody of emergency radios and personal locator beacons. This custody shall also include the responsibility of performing all required MSR MPC inspections.

NOTE

Emergency transceivers are items of primary survival and rescue equipment, no instance of carelessness or willful neglect shall be allowed to pass unnoticed during periodic maintenance inspections.

Continued next page

B.32.b. AN/PRC-90 Survival Radio

The AN/PRC-90 radio (see figure 4-21) is the same size and appearance as the AN/PRC90-2. There are some electronic differences though, the AN/PRC-90 has a Morse Code option (MCW) on top of the radio, where on the AN/PRC-90-2 it has been replaced with a power booster (HI PWR BCN).

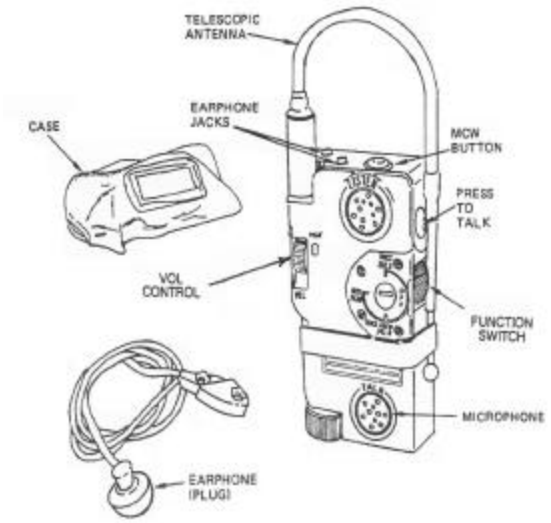

Figure 4-21 AN/PRC-90 Survival Radio

B.32.c. AN/PRC-90-2 Survival Radio

The AN/PRC-90-2 (see figure 4-22) is a dual-channel battery powered personal survival transceiver.

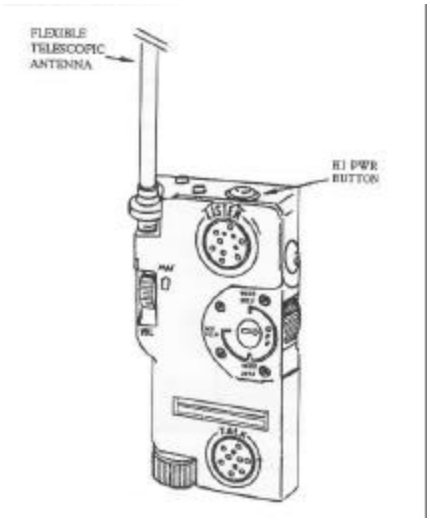

Figure 4-22 AN/PRC-90-2 Survival Radio

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B.32.d. Beacon Mode

The beacon mode of operation transmits a variable modulation frequency that sweeps from 1600 to 300 Hz and then returns instantaneously to the 1600 Hz frequency and repeats the cycle. This occurs at a rate of 2-3 times per second. The signal is readily distinguished from other signals or voice, and is used for homing purposes by Directional Finding (DF) equipped aircraft or ground rescue parties.

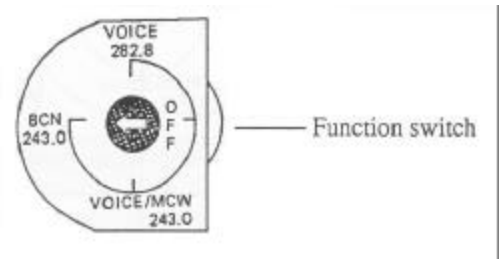
B.32.e. Beacon Transmission Limits

Typical beacon ranges, ground to air, ideal line of sight, with aircraft operating at 10,000 feet:

- 243.0 beacon mode, DF range is 50 nautical miles
- 243.0 beacon mode, audible range is 80 nautical miles
- By using the HI PWR BCN (AN/PRC-90-2) the audible 243.0 beacon range can be increased from 80 miles to 125-miles. Although this will increase the range of the 243.0 beacon, it will also reduce the battery life.

B.32.f. 243.0 Beacon Mode Operating Procedures

Turn function switch clockwise so indicating arrow is pointing toward BCN 243.0



B.32.g. Voice/MCW Mode

The 243.0 Voice/MCW (modular continuous wave) permits two-way voice or morse code communications. The 243.0 frequency is used as an emergency channel.

B.32.h. 243.0 Voice/MCW Limit

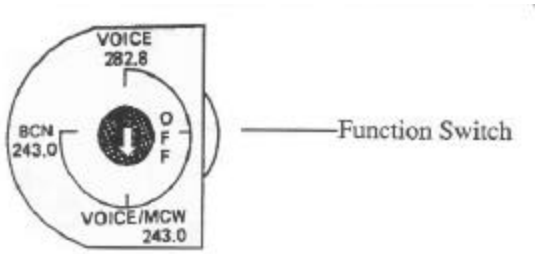
Typical Voice/MCW range, ground to air, ideal line of sight, with aircraft operating at 10,000 feet:

- Voice/MCW is 60 nautical miles

Continued next page

B.32.i. 243.0 Voice/MCW Operating Procedures

To operate the radio in the 243.0 voice mode, proceed as follows:

Step	Action
1	Turn function switch clockwise so indicating arrow is pointing toward Voice/MCW 243.0. 
2	**VOICE OPERATION:** Depress Push-To-Talk button, and speak into microphone. **MCW OPERATION:** Depress MCW button on top of radio to transmit a 1,000 Hz tone. **NOTE**: A morse code chart is printed on the back of the radio.

B.32.j. 282.8 Voice Mode

The 282.8 frequency is used as an alternate frequency. A downed aircrew member would switch to this frequency after gaining communications on the 243.0 frequency. This would leave 243.0 frequency open to receive additional emergency transmissions.

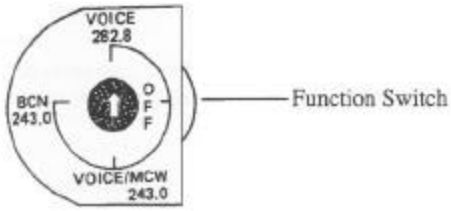
B.32.k. 282.8 Voice Limit

The 282.8 voice mode has the same transmission limits as the 243.0 voice mode (chapter 4, section B.32.h).

Continued next page

B.32.l. 282.8 Voice Operating Procedure

To operate the radio in the 282.8 voice mode, proceed as follows:

Step	Action
1	Depress indicating arrow while turning function switch counter-clockwise so indicating arrow is pointing toward Voice 282.8. 
2	Depress Push-To-Talk button, and speak into microphone.

B.32.m. AN/PRC-90 and AN/PRC-90-2 Survival Radio Operating Precautions

The following precaution shall be observed when operating an AN/PRC-90 or AN/PRC-90-2.

- Operation of radio set AN/PRC-90 or AN/PRC-90-2 is prohibited except during rescue operations, emergency ground-to-ground communications, or under controlled test/training conditions. False distress signals can confuse and delay rescue operations.

- The AN/PRC-90-2 will operate to its optimum potential when there are no trees, buildings, cliffs, water, etc., to impede the transmission of the radio signal. The operating parameters are based on a radio set with a fully charged battery operating in perfect conditions.

- To ensure maximum range when transmitting, hold the radio set so that the antenna is essentially vertical.

- To conserve battery power, set the function switch to OFF when the radio is not in use.

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B.32.m. AN/PRC-90 and AN/PRC-90-2 Survival Radio Operating Precautions (Continued)

The following is a continuation of survival radio operating precautions.

- Make certain that the function switch is not inadvertently left in the BCN 243.0 position. The transmitter is keyed automatically when the switch is in this position.
- For optimum signal reception, DO NOT point the antenna directly at aircraft. Point antenna 90° away from search aircraft for best reception.
- Telescoping antennas must be fully extended during normal operations and testing.
- Do not allow the antenna to touch any part of the body or another object. Any such contact reduces signal strength.
- When operational conditions include temperatures below 10 °C (50 °F), the radio set and spare batteries should be warmed prior to an attempt to use the radio. A cold radio and/or battery will reduce battery life.

B.32.n. AN/PRC-90 and AN/PRC-90-2 Survival Radio Inspection Intervals

The following are inspection intervals for the AN/PRC-90 and AN/PRC-90-2 survival radios.

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the applicable MSR MPC.
- Operational Check: The operational check (inspection) shall not exceed 60-day intervals. This inspection shall be performed in accordance with the applicable MSR MPC.

NOTE

Operational testing is permitted only between the hour and 5 minutes past the hour. Transmission of the beacon tone shall be limited to a maximum of 3 full-wave undulations.

Continued next page

B.32.n. AN/PRC-90 and AN/PRC-90-2 Survival Radio Inspection Intervals (Continued)

NOTE

Radios packed in life rafts and survival kits shall be inspected during normal raft or kit inspection cycles, but shall not exceed 180 days.

B.32.o. AN/PRC-90 and AN/PRC-90-2 Survival Radio Repairs

Repairs to the AN/PRC-90 and AN/PRC-90-2 are limited to the following:

- Battery replacement
- Antenna replacement

B.33. Rescue Swimmer HH940 Radio

Commercially procured rescue swimmer radio (Uniden HH940), is intended for communicating with a rescue aircraft or other rescue assets.

B.33.a. Rescue Swimmer HH940 Radio Configuration

The HH940 radio (see figure 4-23) is a waterproof, portable two-way VHF transceiver. This hand-held VHF marine radio provides reliable performance in virtually all conditions and situations. Some of the HH940 features are as follows:

- 10 Weather Channels
- All Channel Scan
- All USA & International Marine Channels
- Drop-In Charger
- Full-Time Battery Level Indicator
- Instant Channel 9 & 16
- Keypad Lockout

Continued next page

B.33.a. Rescue Swimmer HH940 Radio Configuration (Continued)

The following is a continuation of the HH940 radio configuration.

Figure 4-23 Uniden HH940

B.33.b. Rescue Swimmer HH940 Radio Inspection Intervals

The following are inspection intervals for the Rescue Swimmer Radio (Uniden HH940).

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the applicable MSR MPC.

- Operational Check: The operational check (inspection) shall not exceed 180-day intervals. This inspection shall be performed in accordance with the applicable MSR MPC.

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B.33.c. Rescue Swimmer HH940 Radio Operation Procedures

Operating procedures for the Rescue Swimmer HH940 Radio may be found in the Uniden HH940 Operating Guide.

CAUTION

The Triple Watch mode scans 16, 9, and weather channels. Since the weather channel is continuously updated, the radio will lock onto the weather often, thereby preventing monitoring channels 16 and 9. Because of this, the Triple Watch mode shall not be used during any rescue swimmer operations.

NOTE

Prior to helicopter deployment, the rescue swimmer shall tune the radio to the pre-briefed frequency. After adjusting the volume and squelch, depress and hold the Lock-Key for 5 seconds. This will lock the radio; thus avoiding inadvertent frequency changes. The radio should be left on during the deployment, ensuring immediate access to communications.

B.34. Commercial Drop Radios

Commercially procured radios are intended for use as an aerial deliverable radio to aid survivors in communicating with a rescue aircraft. The recommended drop radios are the Motorola HT-50 and the Uniden HH940 (same radio used by the rescue swimmers).

WARNING

Commercially procured radios are not authorized for use as an aircrew member survival radio.

NOTE

The ADSK, ADS-CAN, or the rotary-wing radio deployment packs are the preferred methods of aerial delivery of commercial VHF radios.

B.35. Mini-B-2 ™ EPIRB

The Mini-B-2 ™ is a Class B (SARSAT capable) personal EPIRB and is packed in the rescue swimmer LRU-18/C life raft.

Continued next page

B.35.a. Mini-B-2 ™ EPIRB Configuration

The Mini-B-2 ™ (see figure 4-24) is the smallest Class B EPIRB available. The o-ring-sealed battery operated unit beacon, with its external antenna, is waterproof and floats. A Light Emitting Diode (LED) indicator confirms signal transmission. Pertinent technical data is as follows:

- Activation: An "ON-OFF" switch is installed on top of the beacon
- Frequency: Transmits simultaneously on 121.5 MHz (civilian) and 243.0 MHz (military)
- Battery: Lithium battery; 12-year shelf life, 6-year replacement interval
- Power Output: Minimum 75 mW on each frequency during 48-hour continuous operation
- Modulation: Downward sweeping tone between 1600 and 300 Hz at 2 to 4 sweeps per second
- Operating Life: 48 hours @ -20 °C (-4 °F), longer in moderate temperate waters.
- Operating Temperature: -20 °C to +55 °C (-4 °F to 131 °F)
- Weight 9.9 ounces

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B.35.a. Mini-B-2 ™ EPIRB Configuration (Continued)

The following is a continuation of the Mini-B-2 ™ EPIRB configuration.

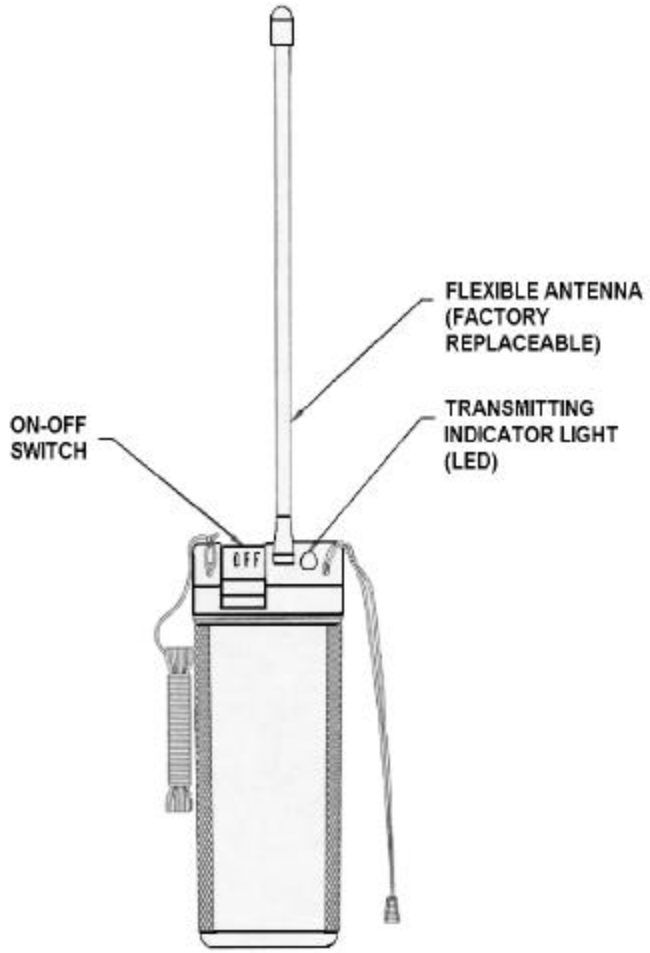

Figure 4-24 Mini-B-2 ™ EPIRB

B.35.b. Mini-B-2 ™ EPIRB Operation Procedures

The following are operating procedures for the Mini-B-2 ™.

NOTE

If deployed in water, make sure that the antenna is positioned vertically (do not point directly toward receiving station) and the antenna itself is out of the water. It is preferable to hold the unit above the water, as immersion reduces effectiveness. An operational transmission on land should be conducted in an area free of obstructions that could absorb RF energy and limit radiation patterns.

Continued next page

B.35.b. Mini-B-2 ™ EPIRB Operation Procedures (Continued)

The following is a continuation of operating procedures for the Mini-B-2 ™.

NOTE

The radiation field null occurs directly off the end of the antenna.

Step	Action
1	Flip the "ON-OFF" switch to "ON."
2	The red LED indicator will illuminate and remain on for 5 seconds indicating that the batteries are functional.
3	After 5 seconds the LED indicator will begin flashing, indicating that the transmitter is functioning properly. If it does not, turn the Mini-B-2 ™ off and repeat steps 1 and 2.

B.35.c. Mini-B-2 ™ EPIRB Inspection Intervals

The following are inspection intervals for the Mini-B-2 ™ EPIRB.

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the applicable MSR MPC.

- Operational Check: The operational check (inspection) shall not exceed 180-day intervals. This inspection shall be performed in accordance with the applicable MSR MPC.

NOTE

Operational testing is permitted only between the hour and 5 minutes past the hour. Transmission of the beacon tone shall be limited to a maximum of 3 full-wave undulations or one operational transmission (LED light flashing) second.

NOTE

EPIRBs packed in life rafts and survival kits shall be inspected during normal raft or kit inspection cycles, but shall not exceed 180 days.

Continued next page

B.35.d. Mini-B-2 ™ EPIRB Repairs

All repairs to the Mini-B-2 ™ EPIRB are to be performed by ACR factory authorized personnel at authorized service centers.

WARNING

To avoid possible fire, explosion, leakage or burn hazard, do not open, recharge, disassemble, heat battery above 71 °C (160 °F) or incinerate.

The Mini-B-2 ™ EPIRB contains lithium batteries (solid cathode, total 3.4 grams lithium). When shipping a Mini-B-2 ™ EPIRB to an authorized service center for repairs or battery replacement, adherence to the following warning is required.

WARNING

DOT regulations require that minimum packaging standards be met when shipping certain materials. The original shipping container should be retained for this reason. If the original container is lost, contact ACR Customer Service prior to shipment of unit. Air station supply division shall also be informed of the shipment (hazardous material).

Section C. Survival Kits

C.1. Survival Kits Overview

There are three types of survival kits used in Coast Guard Aviation.

- Arctic/Antarctic Survival Kits (AASK): Used only by aircrews that routinely operate in polar regions.
- Cold Weather Aircrew Survival Kit (CWASK): Used by all other aircrews at their commands discretion according to their operating area of responsibility.
- Aerial Delivery Survival Kit (ADSK): Maintained by all long-range recovery aircraft stations for aerial delivery to survivors on land or sea.

C.2. Survival Kit Equipment Procurement

WARNING

This procurement authorization is only for procurement of AASK, CWASK, and the ADSK related equipment. All other survival equipment deviations must be authorized through proper ALSE channels.

Contents in the AASK, CWASK, and the ADSK will vary depending on the geographical operating areas. With recent advances in commercial survival equipment technology, equipment that is better suited for a given units geographical operating area, may be commercially purchased at the Commanding Officer's discretion. A list of all equipment carried in the survival kits shall be documented on a locally generated Survival Kit Inventory Form.

C.3. Arctic/ Antarctic Survival Kit (AASK)

The AASKs provide the necessary survival items aircrew members and passengers need to survive in the Arctic or Antarctic regions for 15 days. The two variations of the AASK are as follows:

- AASK- Core: Accommodates a 3 person aircrew
- AASK-PAX: Accommodates up to 3 passengers

Continued next page

C.3.a. Arctic/ Antarctic Survival Kit (AASK) Configuration

The AASK-Core contains a tent, signaling devices, fuel fired stove, survival tools and other miscellaneous survival equipment. The AASK-PAX contains extreme cold weather clothing, sleeping bags, eye protection, and food.

NOTE

The containers for packing and transporting the AASKs will be solely up to the Commanding Officer's discretion.

C.3.b. Arctic/ Antarctic Survival Kit (AASK) Function

Polar operating helicopter crew's use the AASKs when they are forced to land away from their ship due to mechanical failure, emergency, or weather. The AASKs will either be carried by the operational helicopter or delivered to the operational helicopter when its return to ship is delayed by unforeseen circumstances.

C.3.c. Arctic/ Antarctic Survival Kit (AASK) Inspection Intervals

The following are inspection intervals for the Cold Weather Aircrew Survival Kit (CWASK).

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue. This inspection shall be in accordance with the AASK Acceptance MSR MPC. A list of all equipment carried in the AASK shall be documented on a locally generated AASK Inventory Form.

- Visual Inspection: A visual inspection shall be performed during the AVDET Pre-Deployment phase. This inspection shall be in accordance with the AASK Pre-Deployment MSR MPC. A list of all equipment carried in the AASK shall be documented on a locally generated AASK Inventory Form.

C.4. Cold Weather Aircrew Survival Kit (CWASK)

The CWASK is designed for the use of aircrew members who are faced with a cold weather survival situation.

NOTE

The containers for packing and transporting the CWASK will be non-standard due to differing aircraft types and mission needs. The containers used will be solely up to Commanding Officer's discretion.

Continued next page

C.4.a. Cold Weather Aircrew Survival Kit (CWASK) Configuration

Each container in the CWASK will have enough survival equipment for four crewmembers. Additional containers will be placed on board aircraft to support the entire crew for each mission. The CWASK has a tent, sleeping bags, food, fuel-fired stove, signaling devices, skin and eye protection, and other miscellaneous survival items.

C.4.b. Cold Weather Aircrew Survival Kit (CWASK) Function

The CWASK provides the crewmembers with the survival equipment necessary to maintain minimum comfort. The aircrew may use the CWASK when an aircraft has landed in a remote location due to mishap, mechanical failure, or a forced landing because of weather.

C.4.c. Cold Weather Aircrew Survival Kit (CWASK) Inspection Intervals

The following are inspection intervals for the Cold Weather Aircrew Survival Kit (CWASK).

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the CWASK Acceptance Inspection MSR MPC. A list of all equipment carried in the CWASK shall be documented on a locally generated CWASK Inventory Form.

- Visual Inspection: The visual inspection shall not exceed 180-day intervals. This inspection shall be in accordance with the CWASK Visual Inspection MSR MPC. The locally generated CWASK Inventory Form shall be for reviewed missing equipment.

C.5. Aerial Delivery System Can (ADS-CAN)

The ADS-CAN is designed for aerial delivery of survival items on land or at sea. Procured from Lifesaving Systems Corp., P/N 515.

C.5.a. Aerial Delivery System Can (ADS-CAN) Configuration

The ADS-CAN (see figure 4-25) is an orange cylindrical container. The following are configuration characteristics of the ADS-CAN:

- Approximately 20 inches in height.

- To keep the removable lid on tight enough to ensure watertight integrity, a quick access V-band locking ring which requires no tools to open or close is used.

Continued next page

C.5.a. Aerial Delivery System Can (ADS-CAN) Configuration (Continued)

- It has a removable 24-pound ballast bag, which pre-weights it to the minimum 40-pound drop weight.
- Welded to the sides of the ADS-CAN container are metal eyelet straps (harness connection points) and one V-ring (for lower ADS connection point) so it may be delivered using the 12-foot ADS.

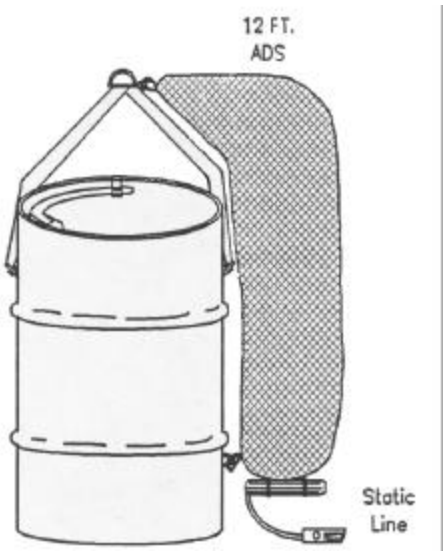

Figure 4-25 ADS-CAN

C.5.b. Aerial Delivery System Can (ADS-CAN) Function

The ADS-CAN may carry spare parts, water, candy, signal devices, and other miscellaneous survival items necessary to sustain survivors until rescue efforts can reach them. The can has a maximum gross weight capacity of 90 pounds, for heavier equipment the ballast bag may be removed to gain weight capacity.

C.5.c. Aerial Delivery System Can (ADS-CAN) Inspection Intervals

The following are inspection intervals for the Aerial Delivery System Can (ADS-CAN).

- Acceptance Inspection: An acceptance inspection shall be performed upon original issue, when received from supply, or accepted from another unit for permanent custody. This inspection shall be in accordance with the ADS-CAN Acceptance Inspection MSR MPC. A list of all equipment carried in the ADS-CAN shall be documented on a locally generated ADS-CAN Inventory Form.

Continued next page

C.5.c. Aerial Delivery System Can (ADS-CAN) Inspection Intervals (Continued)

- Visual Inspection: The visual inspection shall not exceed 180-day intervals. This inspection shall be performed in accordance with applicable manuals. This inspection shall be in accordance with the ADS-CAN Visual Inspection MSR MPC. A list of all equipment carried in the ADS-CAN shall be documented on a locally generated ADS-CAN Inventory Form.

Chapter 5 Oxygen Equipment Table of Contents

SECTION A. OXYGEN EQUIPMENT OVERVIEW

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Section A. Oxygen Equipment Overview

A.1. Introduction

This chapter contains information relating to oxygen equipment. It is sectioned to reflect the different functions and equipment data. The Aviation Survival Technician has the responsibility of maintaining and servicing all aircraft oxygen masks and emergency oxygen bottles.

A.2. Quality Assurance

CAUTION

In no case shall the Aviation Survival Technician perform their own quality assurance inspections.

The procedures detailed present a logical sequence for proper maintenance. Quality assurance steps are provided for critical operations. When a step is followed by **QA REQUIRED**, the Aviation Survival Technician shall perform the step and then have the authorized QA inspector perform the inspection.

A.3. Records

All oxygen equipment shall be subjected to periodic inspections and maintenance. These tasks are the primary assurance of oxygen equipment functioning properly and no instance of carelessness or willful neglect shall be allowed to pass unnoticed. Aviation Computerized Maintenance System (ACMS) and Mandatory Special Requirements (MSR) are used by the Aviation Survival Technician to provide a systematic means of control. The ACMS and MSR Maintenance Procedure Cards (MPC) provide a logical sequence for inspection and maintenance of equipment. Additionally, they provide a REMARKS section to denote any maintenance performed on equipment.

NOTE

The REMARKS section shall be used when any discrepancy is found and corrected if repairable. The information provided in this section is critical in determining equipment reliability, failure trends, and maintenance intervals.

A.4. Repair of Oxygen Equipment

Repair of oxygen equipment is restricted to replacement of components that fail inspection, unless stated otherwise.

Section B. Safety and Handling Precautions

B.1. Safety and Handling Precautions Introduction

The importance of strict adherence to safety and handling procedures cannot be overemphasized.

> **WARNING**
>
> Tools used for oxygen equipment shall not be used for any other operations where contamination (oil, grease) could occur. All tools shall be of non-sparking materials. Aviators breathing oxygen shall not be used in welding operations.

Aviators breathing oxygen is intended for use in aircraft life support systems and may be used in similar applications. Cylinders of aviators breathing oxygen shall not be used for applications that only require technical grade oxygen. This may introduce contaminants into the cylinder, which are difficult to remove by ordinary methods and thereby increase the probability of a product unacceptable for its intended use.

B.2. Safety and Handling Precautions

All personnel responsible for handling gaseous oxygen shall follow safety precautions presented in this manual. To ensure personal safety and efficient handling of gaseous oxygen, all personnel shall be thoroughly familiar with hazards involved.

> **WARNING**
>
> Gaseous oxygen is extremely hazardous when used in the presence of readily combustible materials. Do not permit oil, grease, kerosene, aviation fuel, or any petroleum product to come in contact with oxygen.

The following safety precautions shall be followed by all personnel handling oxygen:

- Only oxygen conforming to MIL-0-27210, Type I shall be used in gaseous oxygen systems or components.

Continued next page

B.2. Safety and Handling Precautions (Continued)

- Exercise care that compressed oxygen does not become contaminated in any way with hydrogen; hydrocarbon gases, or oils base liquids as a serious explosion can result.

- Oil or grease must never be allowed to come into contact with or be used in the presence of oxygen cylinders, valves, regulators, gages, or fittings. Fire or explosion may result.

- Never lubricate oxygen valves, regulators, gages, or fittings with oils or any substance except an approved oxygen-compatible lubricant.

- Hands should be clean and free from oil before using oxygen equipment; do not wear greasy gloves or clothing.

- A spark is not necessary to cause fire or explosion. The chemical reaction caused by a combination of fuel gases and oils with oxygen is sufficient to develop spontaneous combustion and could cause fire or explosion.

- Never permit oxygen cylinders to come into contact with electrical welding circuits or apparatus.

- Do not allow sparks or flames from welding or cutting torch or any other source to contact cylinders.

- Never use oxygen from a cylinder without reducing the pressure through a pressure-reducing regulator.

- Never mix other gases or compressed air in an oxygen cylinder.

- To aid in preventing leakage or material failure due to over torque of gaseous fittings, strict adherence to torque values is mandatory.

- Do not confuse air with breathing oxygen. Oxygen is one of several elements contained in air and should always be described by its proper name. Any attempt to use breathing oxygen in place of compressed air may result in an accident. Never use breathing oxygen for pneumatic tools, for starting diesel engines, as pressure agent in oil reservoirs, for paint spraying or for any use other than breathing, welding or cutting.

Continued next page

B.2. Safety and Handling Precautions (Continued)

- Their green color and 3-inch wide white band around the upper circumference of the cylinder can readily identify aviator's breathing oxygen supply cylinders. OXYGEN AVIATOR'S shall be stenciled in white, parallel to the longitudinal axis, and on diametrically opposed sides in letters 2 inches high.

- Never pressurize an oxygen system without the proper adapter and safety disc installed on the transfer line.

- The amount of oxygen in a cylinder is determined by pressure.

- Before connecting oxygen cylinders to oxygen systems, be sure that each cylinder is properly and correctly identified as containing aviator's breathing oxygen.

- Under no circumstances shall carbon tetrachloride or similar cleaning fluids be used. Minute quantities of these materials will contaminate the oxygen supply.

- Do not clean any elastomer parts (rubberized) that have become contaminated with oil or grease. All such parts shall be replaced.

- Prior to using leak detection compound (MIL-L-25567A), inspect carefully. Compound, which is not clear and free of suspended material/sediment, is considered contaminated and shall be disposed of. Compounds exhibiting peculiar odors such as acetone or alcohol are considered contaminated and shall be disposed of.

- Use leak detection compound sparingly as any solution entering oxygen equipment will contaminate the system. Remove all traces of the compound after test with a clean, damp, lint free cloth.

- The pressures in oxygen supply cylinders which service/replenish aircraft oxygen cylinders should not fall below 50-PSIG. Keep valve closed when not in use. Oxygen cylinders depleted to a pressure of approximately 50-PSIG shall be marked "EMPTY," tagged appropriately, and stored separately from charged oxygen cylinders. All cylinders, which have a pressure below 15-PSIG, shall be removed from service for heat vacuum treatment.

Continued next page

B.2. Safety and Handling Precautions (Continued)

NOTE

A full oxygen cylinder is a cylinder that is charged to its maximum service pressure. With respect to high-pressure emergency oxygen bottles, 1800-PSIG or low-pressure emergency oxygen bottles, 300-PSIG is considered full. To refill is to recharge a bottle to its maximum service pressure, regardless of the residual pressure remaining within the bottle.

- Never refill an emergency oxygen bottle that has gone beyond its hydrostatic test date.
- Do not confuse aviator's breathing oxygen with welding or hospital oxygen. The latter types of oxygen usually have moisture content that would freeze and plug lines and valves of an aircraft oxygen system.
- Leave cap on cylinder when not in use to protect valve. A broken valve may cause a cylinder to rocket like a torpedo and could cause serious injury or death.
- Before opening an oxygen cylinder valve, ensure cylinder is firmly supported. Cylinder valves are to be closed by hand only. If a valve cannot be fully opened by hand, it shall be returned with cylinder for repair. A protective cap shall be installed on the valve of any cylinder not in use.
- Open valves slowly; rapid surges in pressure can damage sensitive equipment and cause extreme temperature rise in small orifices and components.
- Use existing or formulate charging stages when refilling oxygen cylinders and systems. Rapid pressurization creates heat, which can result in fire or explosion.
- Remove high-pressure emergency oxygen bottles from aircraft for servicing.
- Never fill emergency oxygen bottles without using a pressure-reducing regulator. Deaths have occurred by failure to observe this precaution.

Continued next page

B.2. Safety and Handling Precautions (Continued)

- All aircraft oxygen components (mask connection hoses, and emergency oxygen bottles discharge or filler ports) not connected to a system or in use, shall be capped or plugged immediately. Use only clean caps or plugs. Under no circumstance will tape, rag, or paper be used to plug or cap openings.

- Ensure all servicing equipment which is left outdoors is protected by a cover.

- Do not store emergency oxygen bottles in the same bin or cabinet with any materials that are likely to start or accelerate fire.

- Pressure shall be released before attempting to tighten or loosen any oxygen tubing, fittings, or unions.

- Two personnel shall be required to service emergency oxygen bottles with gaseous oxygen. One person shall be stationed at the control valves of the servicing equipment and one person shall be stationed where he or she can observe the pressure in the emergency oxygen bottle. Communication between the two personnel is required in case of emergency.

- A servicing control valve shall not be opened more than ¾ of a turn, so it can be shut-off quickly in an emergency.

Section C. Oxygen Maintenance Shop

C.1. Oxygen Maintenance Shop Requirements Introduction

Since the exclusion of airborne particles is an extremely costly process requiring pressurized rooms, expensive filtration equipment, and elaborate procedures, the cleanliness standards of the oxygen component maintenance shop need not be of clean room quality. An enclosed, air-conditioned clean area, segregated from contaminant producing operations, shall be considered adequate.

C.2. Environmental Conditions

The oxygen shop shall be environmentally controlled as follows:

a. Temperature and Humidity. The climate control system must be able to maintain a temperature of 65 °F to 75 °F and keep humidity below 50 percent. Oxygen facilities may be heated by steam heating units or direct-fired heaters employing an air distribution duct system, providing the heating unit is not located in the transfer shop. Open-fired heaters shall not be used.

b. Ventilation. All air supplied to a shop where gaseous oxygen is transferred from one unit to another shall be exhausted directly into the atmosphere. Under no circumstances shall exhaust air be returned to the oxygen transfer area. Ventilation shall be provided in the oxygen component maintenance shop, test laboratory of storage facilities, and enclosed spaces to prevent accumulation of potentially dangerous concentrations of oxygen. Mechanical exhaust fans capable of providing a minimum of 10 air changes per hour shall be used as a positive means of exhausting the air. Although oxygen is about 10 percent denser than air, it is not necessary to evacuate the air near the floor because oxygen rapidly diffuses into the air.

C.3. Electrical Equipment

All electrical equipment and electrical wiring shall be procured and maintained in accordance with NAVFAC Specification 9Y (latest revision). The following information has been extracted from this specification:

a. Conduit. Rigid conduit shall be used in all wiring installations.

b. Receptacles. Electrical receptacles on the outside of buildings shall be weather proof, 250-Vac, 20-amp (minimum), 3-wire grounding type, and shall be furnished with plugs. Receptacles shall be connected to 220-Vac, single-phase service.

Continued next page

C.3. Electrical Equipment (Continued)

The following is a continuation of the oxygen component shop electrical equipment specification requirements:

c. Lighting Fixtures. Lighting fixtures may be standard types, except that where exposed to mechanical injury, a suitable guard or cover shall be provided.

d. Switches. Switches and motor starting switches shall be enclosed and of the general use type.

e. Motors. Motors shall be of a type that does not have arcing or contact making parts. Three-phase motors of squirrel cage type shall be used wherever possible.

f. Grounding. All equipment shall be static-grounded.

g. Transformers. Transformer banks shall be located a minimum of 50-feet from transfer shop or storage areas.

C.4. Interior Finishing and Fixtures

Interior finishing and fixtures must minimize potentially hazardous conditions.

a. Floors. In shops where gaseous oxygen transfer operations are conducted, a concrete floor or vinyl-type floor covering is considered adequate. Non-glazed or rough-glazed ceramic tile is also a suitable floor finish.

b. Walls. The walls shall be finished with a smooth, impact-resistant, non-chipping, non-flaking material.

c. Ceilings. The ceiling shall be easily cleanable, non-dust accumulating acoustical type material.

d. Work Benches, Tables, and Storage Bins. Workbenches and tabletops shall be of seamless, non-porous material free of hydrocarbon finishes. Color shall contrast with walls and ceilings to minimize eye fatigue. Storage bins shall not contain more than the required parts to maintain an orderly production rate. Workbenches, tables, and storage bins shall be maintained free of grease, oil, and other combustible materials.

Continued next page

C.5. Oxygen Work Area Cleanliness Requirements

The following are oxygen work area cleanliness requirements that shall be adhered to at all times.

- Work areas shall be kept clean at all times.
- Dust and dirt removal shall be accomplished by a vacuum system at any time that dust is evident at any location in the work area.
- Damp mopping will be used to follow up the vacuum cleaning for dirt and dust removal.
- Heel and chair marks or other discoloration of the floors shall be removed by scrubbing.
- All spare parts shall be removed from the workbenches or covered with lint free covering at the end of the last work shift each day.
- Work benches and test equipment will be wiped clean prior to the start of each workday.
- Smoking or refreshments of any kind shall not be permitted in the work area.
- Only ball type pens are permitted for use in the shop.

C.6. Personal Cleanliness Requirements

The following are personal cleanliness requirements during oxygen equipment maintenance that shall be adhered to at all times.

- Solvent contact with the skin should be avoided where possible.
- Fingernail polish shall be removed prior to entering shop. Personnel shall not wear cosmetics and medication that may produce contamination.
- Personnel with skin and/or upper respiratory diseases should not be allowed to work in the overhaul shop area.
- Personnel with colds, temporary coughing, sneezing, and severe sunburn should be assigned temporary jobs outside the shop until they are sufficiently recovered.

Continued next page

C.7. Oxygen Tool Requirements

The following are oxygen tool requirements that shall be adhered to at all times.

- All oxygen equipment maintenance tools shall be constructed of a non-sparking material.
- All tools and equipment shall be maintained free of grease, oil, and other combustible materials.
- Tools used on oxygen equipment shall not be used for any other purpose.
- Tools should be marked OXYGEN USE ONLY. Other suitable methods of identification may be used.

C.8. Approved Oxygen Lubricants

Specific lubricants approved for use with oxygen equipment are listed in appropriate ACMS and MSR MPC's.

NOTE

Type III Krytox and Type III Tribolube 16 shall not be used on aluminum or magnesium fittings in applications where shear stress would be encountered.

MIL-T-27730 Teflon tape shall be used specifically as a thread sealant.

MIL-M-7866 Molybdenum Disulfide shall be used on stainless steel flared fittings and on those applications where MIL-T-27730 Teflon tapes cannot be used.

C.9. Oxygen Training Requirements

Shop supervisors shall be responsible for conducting a continuing training program stressing the significance of oxygen system cleanliness, personal cleanliness, and the oxygen safety program. Conscientious adherence to all cleanliness requirements and safety regulations shall be observed at all times.

Section D. Gaseous Oxygen Systems

D.1. Gaseous Oxygen Systems Introduction

Aircraft oxygen systems provide the aircrew member with diluted or 100 percent oxygen for breathing. The gaseous oxygen system provides facilities to store gaseous oxygen in cylinders at either high or low pressure and deliver it to the aircrew member at a reduced pressure for breathing.

D.2. Gaseous Oxygen Systems Configuration

Gaseous oxygen systems are used primarily in aircraft where space and weight considerations are less important. All Coast Guard gaseous oxygen systems consist of the following components.

Parts	Functions
Main Supply Cylinder(s)	For storing the oxygen supply.
Valves	Various Valves direct the oxygen through the proper tubing.
Regulator(s)	Used to control the flow of oxygen to users.
Pressure Gage(s)	Indicates oxygen pressure.
Masks	Directs the flow of oxygen to each user.
Emergency Oxygen bottle(s)	Provides emergency oxygen in a bottle that allows the user to move freely around the aircraft to perform emergency procedures or combat fire.

D.3. Gaseous Oxygen Systems Categories

Aircraft gaseous oxygen systems installed in Coast Guard aircraft fall into one of the following categories:

- High-pressure (0-1800 PSIG)
- Low-pressure (0-500 PSIG)

Continued next page

D.4. Maintenance Categories

Maintenance is divided into the following two categories:

- Preventive maintenance is the care and servicing needed to maintain equipment and facilities in satisfactory operating condition by providing for systematic inspection, detection, and correction of incipient failures either before they occur or before they develop into major defects.

- Corrective maintenance is maintenance actions performed as a result of failure to correct defects discovered during preventive maintenance or to restore an item to a specified satisfactory condition.

When performing either of the above maintenance actions the following guidelines shall be followed.

- Functional Check. When maintenance action involves the removal and reinstallation of connecting hardware without a change in adjustment/alignment to the system, a thorough ground functional check shall be conducted prior to the aircraft being released for flight.

- Torque Values. When maintenance actions involve the removal and reinstallation of connecting hardware, strict adherence to torque values is mandatory.

Section E. Gaseous Oxygen Servicing Trailer

E.1. Gaseous Oxygen Servicing Trailer Introduction

The oxygen-servicing trailer is designed to charge both high and low pressure oxygen systems installed on aircraft.

E.2. Gaseous Oxygen Servicing Trailer Configuration

The Gaseous Oxygen Servicing Trailer (see figure 5-1) consists of eight oxygen cylinders mounted on a trailer with associated lines, valves and gages necessary for operation of the unit. The storage box is also mounted on the trailer for storing the servicing hoses. The trailer has three wheels. The front wheel or jack assembly can be retracted or extended manually. The front wheel should be extended while parked and retracted while towing. The front wheel or jack assembly also has a hand crank that will raise or lower to facilitate connecting the lunette eye to various tow vehicles with the pintle hooks at different heights above the ground. The trailer is designed for towing over smooth paved surfaces or steel landing mats and over unimproved surfaces, such as an open field or rough road conditions.

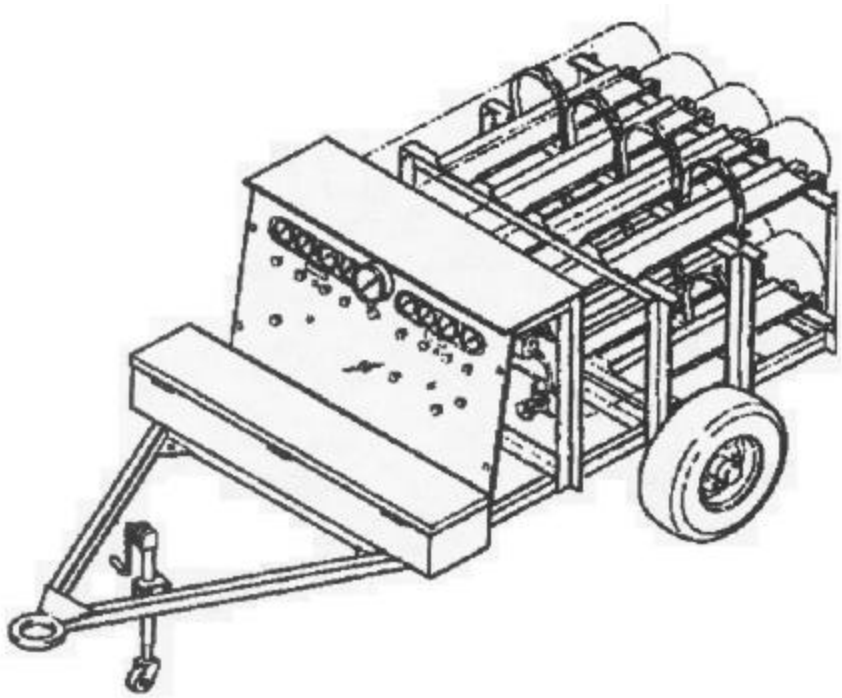

Figure 5-1 Gaseous Oxygen Servicing Trailer

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E.3. Gaseous Oxygen Servicing Trailer Towing

The following are towing procedures for the gaseous oxygen-servicing trailer.

Step	Action
1	**NOTE** All valves should be closed while the oxygen trailer is being towed. Open the valves mounted on the forward end of the cylinders and check the indication on the pressure gages on the control panel. Close the cylinder valves.
2	Align the pintle-hook on the tow vehicle with the lunette eye on the tow bar using the hand crank to attain the proper height.
3	Connect the oxygen trailer to the tow vehicle. Operate hand crank to relieve all weight from the jack assembly.
4	Pull the locking handle out to release the jack assembly and rotate the jack assembly to the retracted position.
5	Release the locking handle, ensuring that it locks the jack in the retracted position.
6	Check that the entire lengths of servicing hoses are inside the storage box.
7	Tow the oxygen trailer to the desired area, observing the 15-mph maximum speed limit.
8	Apply the trailer parking brakes.
9	Rotate the jack assembly to the extended position and ensure that the locking handle is securely engaged.
10	Operate hand crank as necessary to facilitate disconnecting the tow vehicle.

E.4. Preparation for Operation

Tow the trailer to within 30 feet of the servicing area. If trailer is to remain attached to the tow vehicle, the jack assembly may remain in the retracted position. If tow vehicle is to be removed, disconnect the trailer in accordance with chapter 5, section E.3.

E.5. Gaseous Oxygen Servicing Trailer Modifications

There are no modifications authorized to the gaseous oxygen servicing trailer at this time.

E.6. Gaseous Oxygen Servicing Trailer Maintenance

The maintenance of the gaseous oxygen servicing trailer consists of the following:

NOTE

A record of maintenance shall be noted on a locally prepared log book attached to the trailer

Periodical maintenance of the trailer shall be performed in accordance with T.O. 35D3-6-39-1.

- Removal of Empty Cylinders
- Installation of Full Cylinders
- Replacement of Drying Agent

E.6.a. Removal of Empty Cylinders

To remove empty cylinders, proceed as follows:

WARNING

The trailer should be unloaded and loaded while connected to a towing vehicle.

NOTE

The servicing trailer is capable of having its cylinders recharged without removal. However, most operating activities replace the empty cylinders with full cylinders.

Never completely expend the supply of oxygen from a cylinder. Always leave a residual pressure in excess of 50 PSI.

Continued next page

E.6.a. Removal of Empty Cylinders (Continued)

The following is a continuation of the removal of empty cylinder procedures.

Step	Action
1	Connect the oxygen servicing trailer to a towing vehicle.
2	Close all valves on the manifold prior to removing cylinders.
3	Close cylinder shutoff valve.
4	Disconnect the flexible hose, which connects the cylinder to the manifold.
5	Install cylinder safety cap.
6	Loosen the cylinder clamps.
7	Remove the empty cylinder.

E.6.b. Installation of Full Cylinders

To install full cylinders, proceed as follows:

WARNING

The trailer should be unloaded and loaded while connected to a towing vehicle.

Step	Action
1	Place the cylinder in approximate channel, ensuring cylinder is firmly seated against the forward cylinder stop.

Continued next page

E.6.b. Installation of Full Cylinders (Continued)

The following is the continuation of the install full cylinders, proceed.

Step	Action
2	Remove the cylinder safety cap. Position the cylinder so that the cylinder valve outlet may be easily connected to the flexible hose without causing undue strain.
3	**NOTE** Prior to connecting the hose to the cylinder, open the cylinder valve slightly to blow any foreign matter from the valve. Connect the flexible hose to the cylinder valve. After tightening coupling nuts, ensure hose is free from twists.
4	Tighten cylinder clamps.
5	All cylinder valves shall remain closed until trailer is positioned for servicing an aircraft.

E.6.c. Replacement of Drying Agent

To replace drying agent, proceed as follows:

NOTE

Replacement of drying agent cartridge is required after every 12 cylinders have been used.

Step	Action
1	Unscrew cap at end of dryer assembly.
2	Remove old canister and discard.
3	Install new canister (NSN 4440-00-580-7293).
4	Install cap onto dryer assembly, ensure cap is hand tightened only to prevent damage to o-ring on dryer.

Section F. Emergency Gaseous Oxygen Bottles

F.1. Aircraft Emergency Oxygen Bottles Introduction

Aircraft emergency gaseous oxygen bottles are self-contained portable breathing devices capable of supplying breathing oxygen to flight personnel for normal or emergency use. Emergency oxygen bottles installed in Coast Guard aircraft are as follows:

- Low pressure (50-500 PSIG) used in the HC-130
- High-pressure (50-1850 PSIG) used in the HU-25

F.2. MA-1 Emergency Oxygen Bottle

The emergency oxygen bottle (regulator and cylinder) type MA-1 (see figure 5-2) is a self-contained portable breathing device capable of supplying breathing oxygen to flight personnel for normal or emergency use. The regulator, hereafter referred to as the A-21 which forms part of the unit, is a demand/pressure breathing type regulator which will deliver oxygen to the user upon demand or provide a positive pressure to the mask depending upon the positioning of the selector knob. The unit is intended for emergency use with the full-face smoke mask (P/N 651-280), the MBU-10 oxygen mask.

Figure 5-2 MA-1 Emergency Oxygen Bottle

Continued next page

F.2.a. MA-1 Emergency Oxygen Bottle Characteristics

Characteristics for the type MA-1 emergency oxygen bottle are provided below:

• Operating Altitude Range	Sea Level to 43,000 ft
• Normal Operating Service Pressure	375-PSI (at 70 °F)
• Visual Indicator	Pressure gage
• Selector knob:	
- NORM	100% Oxygen on demand
- 30M	Provides 100% oxygen at a positive pressure of 1.6-2.4 INH_2O (inches of water pressure)
- 42M	Provides 100% oxygen at a positive pressure of 5.5-6.5 INH_2O
- EMER	Provides 100% oxygen at a positive pressure of 12.0-14.0 INH_2O
• Overall Dimensions:	
- Length	5 9/16-in.
- Width	5 ½in.
- Height	4 9/16-in.
- Weight	2.1 lbs.
• Hydrostatic Test	N/A

F.3. MA-1 Emergency Oxygen Bottle Inspection Intervals

The following are inspection intervals for the MA-1 emergency oxygen bottle.

- A Pre/Postflight Inspection shall be performed prior to and after each flight.

- A Calendar Inspection shall be performed (IAW ACMS MPC) upon original issue, when received from supply, or accepted from another unit for permanent custody and every 30 days thereafter. Regularly scheduled calendar inspections should be scheduled to coincide with the oxygen mask calendar inspections. When a complaint is received regarding the operation of the MA-1, a calendar inspection shall be performed.

Continued next page

F.3.a. MA-1 Emergency Oxygen Bottle Pre/Postflight Inspection

It is the responsibility of AST shop personnel to train unit personnel to perform Pre/Postflight Inspections of the MA-1 emergency oxygen bottles on assigned aircraft. To perform a Pre/Postflight Inspection of the MA-1 emergency oxygen bottles, proceed as follows:

Step	Action
1	Check for legibility of all markings.
2	Check for low or improper reading on regulator pressure gage.
3	Check selector knob in NORM position.
4	Check regulator and surrounding area for freedom from dirt and hydrocarbons.
5	Check oxygen mask delivery hose and connector for cuts, fraying, kinking, hydrocarbons and general condition.
6	Report noted discrepancies to Maintenance Control.

F.4. MA-1 Emergency Oxygen Bottle Servicing

To perform servicing of the MA-1 emergency oxygen bottle, proceed as follows:

WARNING

Do not service the MA-1 emergency oxygen bottle with high-pressure oxygen.

Step	Action
1	Connect regulator filler adapter to aircraft recharge assembly.
2	Verify selector knob is in the NORM position.
3	Slowly charge the oxygen cylinder to 375-PSI.
4	Shut off oxygen source and disconnect regulator and oxygen cylinder from regulated source of aviator's breathing oxygen.

Continued next page

F.5. MA-1 Emergency Oxygen Bottle Purging

If an MA-1 emergency oxygen bottle is not recharged within 2 hours after its pressure is reduced below 25-PSI, the bottle must be purged. To perform purging of the MA-1 emergency oxygen bottle, proceed as follows:

WARNING

Do not service the MA-1 emergency oxygen bottle with high-pressure oxygen.

Step	Action
1	Connect regulator filler adapter to aircraft recharge assembly.
2	Slowly charge the oxygen cylinder to 375-PSI.
3	Shut off oxygen source and disconnect regulator from the aircraft recharge assembly.
4	Turn selector knob to 30M position and deplete oxygen from oxygen cylinder through regulator.
5	Turn selector knob to NORM position and repeat steps 1 through 4 twice.
6	After purging is completed, fill MA-1 portable walk around unit to 375-PSI.

F.6. MA-1 Emergency Oxygen Bottle Maintenance

Maintenance of the MA-1 emergency oxygen bottle is limited to inspection testing and tightening of loose screws and fittings. Ensure that anti-seize tape is used on pipe threads. For all other discrepancies, return the MA-1 (condition NRFI) to ARSC for repair.

Continued next page

F.7. MA-1 Emergency Oxygen Bottle Trouble Shooting Guide

The following is a Trouble Shooting Guide for the MA-1 emergency oxygen bottle.

Trouble	Probable Cause	Remedy
Oxygen cylinder pressure gage fails to indicate proper pressure	• Defective gage • Low cylinder pressure • Defective inlet assembly	• Return NRFI to ARSC • Refill • Return NRFI to ARSC
Oxygen not available at mask with selector knob in NORM position with proper pressure source to regulator	• Hose to mask is kinked • Regulator not functioning properly	• Straighten hose reposition outlet • Return NRFI to ARSC
Oxygen not available at mask with proper source to regulator with selector knob in 30M, 42M, and EMER positions	• Kinked or other malfunction between hose and mask • Regulator malfunctioning or out of adjustment	• Replace or readjust equipment as necessary • Return NRFI to ARSC
Gage pressure drops when regulator is not in use	• Loose or leaking connections • Defective regulator	• Tighten or replace connections as necessary • Return NRFI to ARSC
Inlet fitting leaking	• Loose inlet fitting • Damaged threads on inlet fitting	• Tighten inlet fitting • Return NRFI to ARSC
Pressure gage leaking	• Loose pressure gage • Damaged pressure gage	• Tighten pressure gage • Return NRFI to ARSC
Oxygen filler valve leaking	• Defective filler valve	• Return NRFI to ARSC

Continued next page

F.7. MA-1 Emergency Oxygen Bottle Trouble Shooting Guide (Continued)

The following is the continuation of the Trouble Shooting Guide for the MA-1 emergency oxygen bottle.

Trouble	Probable Cause	Remedy
Leaking relief valve	• Defective relief valve	• Return NRFI to ARSC
Leakage at demand valve port	• Damaged tilt valve	• Return NRFI to ARSC

F.8. 5500 Series Emergency Oxygen Bottle

The 5500 series (high-pressure) emergency oxygen bottle (see figure 5-3) provides a portable-breathing source. It contains an outlet assembly (7) for quick installation of the MF10-03-01 full-face quick donning mask. Additional information on the 5500 emergency oxygen bottle may be found in the Scott Maintenance Manual, 35-30-77.

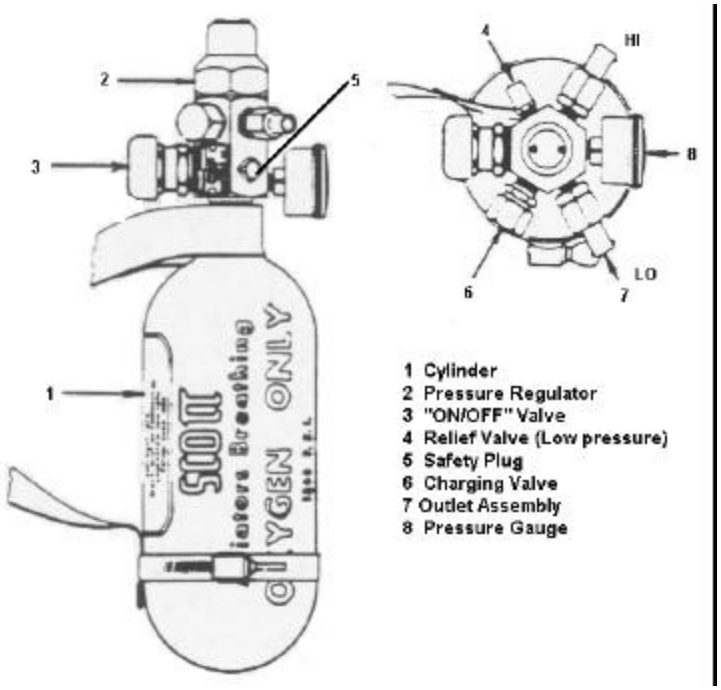

Figure 5-3 5500 Series Emergency Oxygen Bottle

Continued next page

F.9. 5500 Series Emergency Oxygen Bottle Characteristics

Characteristics for the type 5500 series emergency oxygen bottle are provided below:

- Operating Altitude Range — Sea Level to 40,000 ft
- Normal Operating Service Pressure — 1800 +50/-0 PSI (at 70 °F)
- Visual Indicator — Pressure gage
- "ON/OFF" Selector knob — 100% Oxygen on demand

F.10. 5500 Series Emergency Oxygen Bottle Inspection Intervals

The following are inspection intervals for the 5500 series emergency oxygen bottle.

NOTE

Oxygen bottles requiring hydrostatic testing should be depleted to 50-PSI and tagged as Condition Code F (NRFI) prior to turning in at unit supply for shipment to ARSC.

- An Acceptance Inspection shall be performed (in accordance with MSR MPC) upon original issue, when received from supply, or accepted from another unit for permanent custody.
- A Calendar Inspection (inspect) shall be performed every 12 months thereafter in accordance with MSR MPC. When a complaint is received regarding the operation of the 5500 series emergency oxygen bottle, a calendar inspection shall be performed.
- Hydrostatic Testing shall be performed every 60 months in accordance with MSR MPC. A bottle with a hydrostatic date that will expire prior to the next scheduled calendar inspection (12 months) shall be tagged as Condition Code F (NRFI) and returned to ARSC for testing.

Continued next page

a

F.11. 5500 Series Emergency Oxygen Bottle Servicing

Servicing of the 5500 series emergency oxygen bottle shall be IAW the applicable MSR MPC.

WARNING

Do not service an emergency oxygen bottle with direct unregulated high-pressure oxygen.

F.12. 5500 Series Emergency Oxygen Bottle Purging

If a 5500 emergency oxygen bottle is not recharged within 2 hours after its pressure is reduced below 25-PSI the bottle must be purged. To perform purging of the 5500 series emergency oxygen bottle, proceed as follows:

Step	Action
1	Service the oxygen bottle IAW chapter 5, section F.11.
2	Disconnect the servicing hose from the emergency oxygen bottle. Do not allow the servicing connector, valve, or attaching parts to come in contact with the ground.
3	Install an oxygen inlet connector plug into the outlet assembly.
4	Open the “ON/OFF” valve, and deplete oxygen from oxygen bottle through regulator outlet assembly.
5	Repeat steps 1 through 4 twice.
6	After purging is completed fill to 1800 +50/-0 PSI.

F.13. 5500 Series Emergency Oxygen Bottle Maintenance

Maintenance of the 5500 series emergency oxygen bottle is limited to MSR MPC inspections and tightening of loose fittings. For all other discrepancies, return the emergency oxygen bottle to ARSC tagged Condition Code F (NRFI) for repair.

Section G. MF10-03-01 Full-Face Quick Donning Mask

G.1. MF10-03-01 Full-Face Quick Donning Mask Introduction

The MF10-03-01 full-face quick donning mask (see figure 5-4) is an emergency breathing apparatus designed for flight crews flying at high altitudes. The mask protects the flight crew against the effects of depressurization, contaminated air and toxic fumes. It is used both for respiratory and eye protection. It is supplied at a rated pressure of 5-bar (72.5-PSIG) through a hose coupling and can be donned single handed in less than 5 seconds. The wide clear lens of high optical quality allows the donner to wear corrective regulation glasses. This unit also incorporates several anti-mist devices.

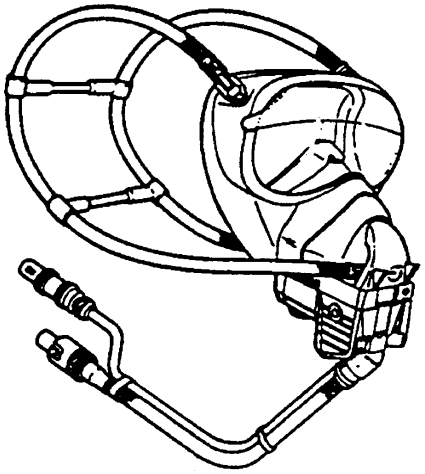

Figure 5-4 MF10-03-01 Mask

G.2. MF10-03-01 Mask Characteristics

Characteristics for the MF10-03-01 mask are provided below in two separated groups.

- General Characteristics:

- Weight	0.730 kg (1.61 lb.)
- Operating temperature	20 °C to + 60 °C (4 °F to + 140 °F)

- Mechanical Characteristics:

- Rated supply pressure	5-bar (72.5-PSIG)
- Operating pressure	4.2/5,9 bar (60/25-PSIG)
- Maximum flow rate	120 l/min. NTPD
- Maximum operating altitude	40,000 feet (12,192-m)
- Readiness time (donning)	5 seconds maximum

Continued next page

G.3. MF10-03-01 Mask Sub-Assemblies

The MF10-03-01 mask consists of the following five sub-assemblies:

- Inflatable Harness
- Mask
- Microphone
- Oxygen Regulator
- Hose Assembly

G.3.a. MF10-03-01 Mask Inflatable Harness Sub-Assembly

The inflatable harness sub-assembly (see figure 5-5) consists of a mechanical and pneumatic coupling block (1), made of self extinguishing plastic, to which are fitted the silicone elastomer harness tubes (2 and 3) covered with an expanding braid. Two flexible spacers (4 and 5) attach the tubes. Each end of tubes is provided with a buckle (6), secured by a pin for the attachment to the mask face piece. A sealing ring (7), fitting into a recess in the lower section of the coupling block, seals the connection between the harness and the regulator, allowing the harness to be supplied with oxygen under pressure.

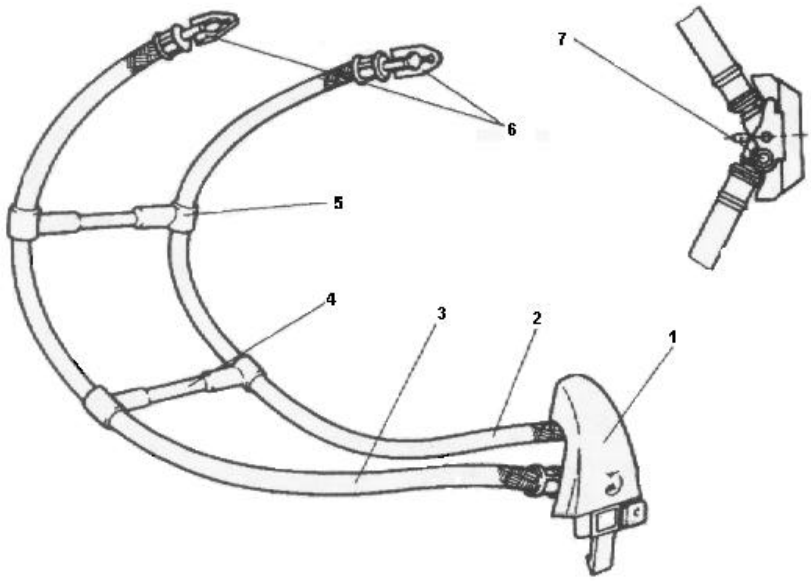

Figure 5-5 MF10-03-01 Inflatable Harness

Continued next page

G.3.b. MF10-03-01 Mask Sub-Assembly

The mask sub-assembly (see figure 5-6), consists of a silicone-elastomer face piece (8) fitted with a plastic mask shell (7). The mask includes a double transparent plastic window (5) providing a wide angle of view. This window is inserted into a groove on the face piece; held in place on the upper part by a lock (2) and on the lower part by a pin. The hose cup is provided with a stiffener (4), which protects a venting valve (6) consisting of a housing valve and a flapper. The upper part of the face piece comprises an anti-mist aluminum-alloy condenser (1). The lower section of the mask shell is provided with an opening through which it is directly connected to the regulator. The electrostatic protective film (3) with a detachment tab is applied on the upper part of the window (5) to protect it against scratches.

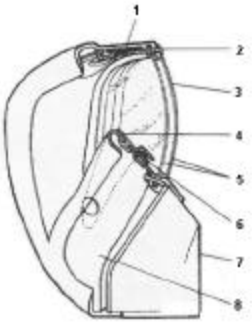

Figure 5-6 MF10-03-01 Mask Sub-Assembly

G.3.c. MF10-03-01 Mask Microphone Sub-Assembly

This sub-assembly consists of a silicone elastomer protector housing the microphone-housing capsule. The protector is provided with a fitting for the passage of the intermediate radio cord. This sub-assembly is secured to the regulator dilution nozzle and to the mask lock by means of two fittings. This arrangement enables the separation of the regulator from the mask without removing the microphone.

G.3.d. MF10-03-01 Mask Regulator Sub-Assembly

The regulator sub-assembly (see figure 5-7) is provided with three red manual controls. On the right side, the inflation control plate (2) actuating a by-pass valve which inflates (when pressed) or deflates (when released) the harness. On the left side, the dilution plate assembly (4) composed of a “N - 100%” spring loaded rocker (3) which maintains a valve in open (“N” - normal oxygen) or closed (100% - oxygen) position.

Continued next page

G.3.d. MF10-03-01 Mask Regulator Sub-Assembly (Continued)

On the lower face, a "Test" and "Emergency" knob (6) which performs the following functions; the functional test of the regulator when depressed; the delivery of positive safety pressure at any altitude when turned. The upper face features a centering cone, housing an O-ring (1), which connects and seals the mask to the regulator. A recess which enables the coupling block of the inflatable harness to be connected to the regulator and to be supplied with oxygen under pressure. A mask lock (9) located above the centering cone to secure the mask to the regulator.

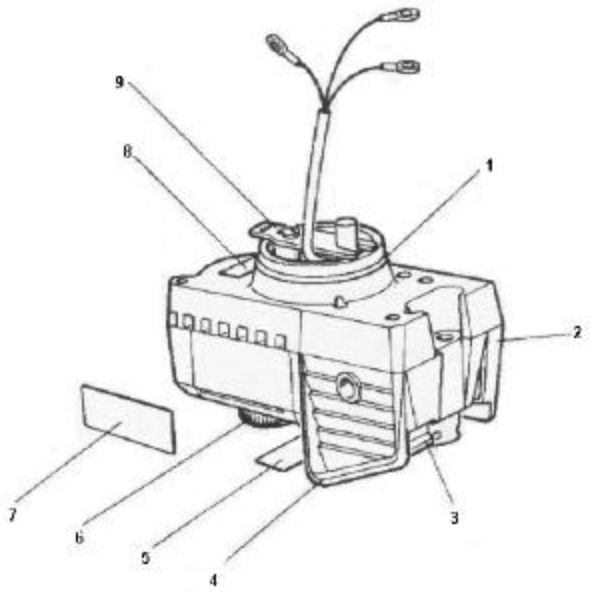

Figure 5-7 MF10-03-01 Regulator

G.3.e. MF10-03-01 Mask Hose Sub-Assembly

The hose assembly gathers the supply hose and radio cord attached by means of sleeves. Identification tape of the hose assembly is attached to the hose, on bayonet coupling side. The supply hose consists of a silicone elastomer tube with a fitting crimped to each end; at one end a male bayonet coupling and the other has a special coupling, which connects the tube to the regulator. This coupling is secured to the regulator inlet by a locking block riveted over by a hot iron. An O-ring housed in a groove in the special coupling seals the connection. Two silicone sleeves fitted to each end cover the crimping ferrules. One end of the radio cord is connected to the regulator under the cover plate and the other end is fitted with a locking electrical connector.

Continued next page

G.4. MF10-03-01 Mask Operation

The oxygen for the MF10-03-01 mask is delivered by the aircraft supply oxygen system, through the supply hose, at a rated pressure of 5-bar (72.5-PSIG). The various operating features of the mask are separated into the following operation descriptions:

- Operation of Inflatable Harness
- Operation of Regulator

Refer to figure 5-8 during review of the operating procedures.

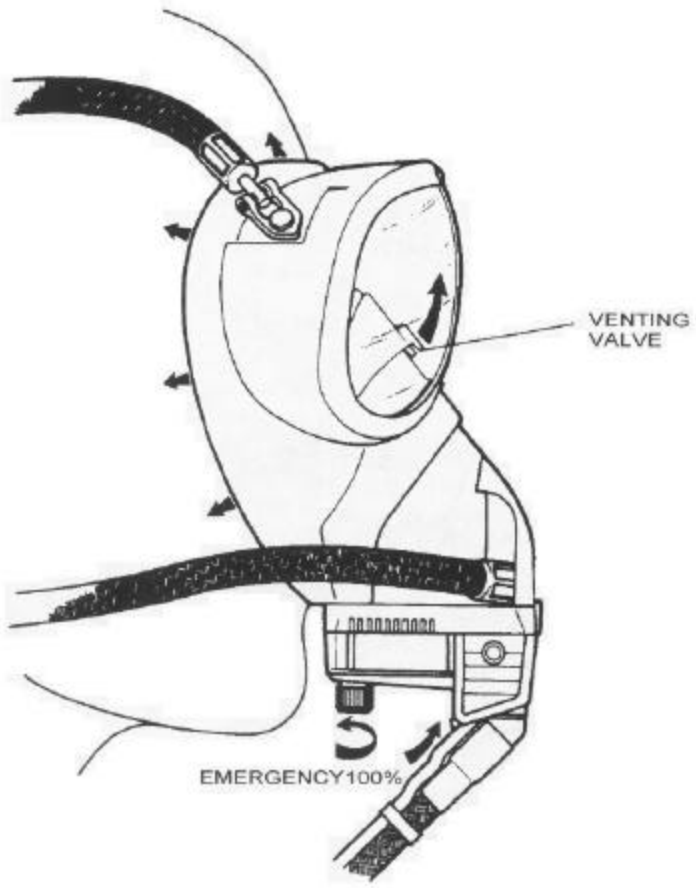

Figure 5-8 MF10-03-01 Mask Operation

Continued next page

G.4.a. MF10-03-01 Mask Operation of the Inflation Harness

The following is the inflation harness operational sequencing and description of operation.

Stage	Description
1	The harness inflation control plate is depressed and is thrust against a piston.
2	Oxygen enters through an inlet duct and flows along the piston and passes through an outlet duct inflating the pneumatic harness.
3	The mask is then extracted from its stowage box
4	When the harness is inflated, it acquires the diameter and rigidity, which enables it to be fit over the head.
5	When the user has fit the mask in place, the inflation control plate is released.
6	Under the pressure of oxygen, the piston returns to its initial position and cuts off the supply of oxygen and at the same time vents the harness to the outside air, thus deflating the harness which closes around the user's head and holds the mask firmly against the user's head.

G.4.b. MF10-03-01 Mask Operation of the Regulator

The following is the regulator operational sequencing and description of operation.

Stage	Description
1	When the regulator is supplied initially, the oxygen entering through the inlet duct passes through a filter and calibrated section then into a chamber.
2	A pilot valve is held closed by the pressure of a spring on the combined diaphragm. As the oxygen is not able to leave the chamber, the pressure equalizes on either side of the main valve, which, due to the differences of its working surfaces, is thrust against its seat, thus shutting off the flow of oxygen to the mask.

Continued next page

G.4.b. MF10-03-01 Mask Operation of the Regulator (Continued)

The following is the continuation of the regulator operational sequencing and description of operation.

Stage	Description
3	When the user inhales, a negative pressure is created in the chamber; the combined diaphragm is deformed and lifted off the pilot valve, at the same time compressing the spring. The pressure falls in the chamber and, under the effect of differential pressure, the main valve is deformed and allows oxygen to flow to the mask.
4	When the rocker is in the "N" position, the user breathes a mixture of air and oxygen; ambient air being drawn in by the injector slaved to the dilution nozzle. The quantity of outside air drawn in through the port is regulated by the position of an aneroid capsule, which reaches the completely closed position at an altitude of 35,000 feet.
5	When the rocker is in the "100 %" position, the user breathes pure oxygen at all altitudes.
6	When the user exhales, a positive pressure is created in the chamber. The combined diaphragm is deformed under the simultaneous action of the expiratory pressure and the spring, and closes the pilot valve. This causes the pressure to increase in the chamber, thus closing the main valve. At the same time, the outer edge of the combined diaphragm is lifted off its seat, thus acting as a compensating expiratory valve.
7	Between 35,000 feet and 41,500 feet automatic positive pressure is regulated by an aneroid capsule, which expands in accordance with altitude.
8	Operation of the regulator under permanent positive pressure is obtained by turning the control knob.
9	When this knob is in "EMERGENCY" position, the valve to which it is linked is thrust against its seat, isolating the chamber and simultaneously pushes on a leaf spring of the valve and opens a calibrated bleed.

Continued next page

G.5. MF10-03-01 Mask Inspection Intervals

A Calendar Inspection (IAW MSR MPC) shall be performed upon issue and every 30 days thereafter. When a complaint is received regarding the operation of the mask, a calendar inspection shall be performed. The calendar inspection consists of the following tasks:

- Disassembly
- Inspection
- Cleaning
- Functional Test
- Sanitizing

G.6. MF10-03-01 Mask Repairs

Minor repairs are authorized for the ICS connection plug only. If any other discrepancies are found, return the mask NRFI to ARSC for repair.

G.7. MF10-03-01 Mask Preventative Maintenance

Preventative maintenance to the MF10-03-01 oxygen mask is limited to replacement of the face plate protective strip, cleaning and disinfecting the sub-assemblies in accordance with the applicable ACMS MPC.

G.8. MF10-03-01 Mask Storage

The following are guidelines for storing the MF10-03-01 mask.

- After using a mask, wipe it clean and store in its approved container that will keep the mask clean, dry and lint-free.
- Masks are to be sanitized before storage.
- Stored masks must have ample ventilation and not be exposed to excessive heat or direct sunlight.
- The mask is not to be stored in an area where other flight gear will be stored on top of it.

Section H. 1506V Folding Quik-Don Mask

H.1. 1506V Folding Quik-Don Mask

The 1506V folding quik-don mask (see figure 5-9) permits an HC-130 aircrew member to breathe gaseous oxygen from the aircraft oxygen supply system or the MA-1 emergency oxygen bottle. The quick-donning feature permits extremely rapid removal from storage and donning with one hand in the event of an emergency. In the event of smoke, the vented anti-smoke goggles are worn with the folding quik-don mask assembly.

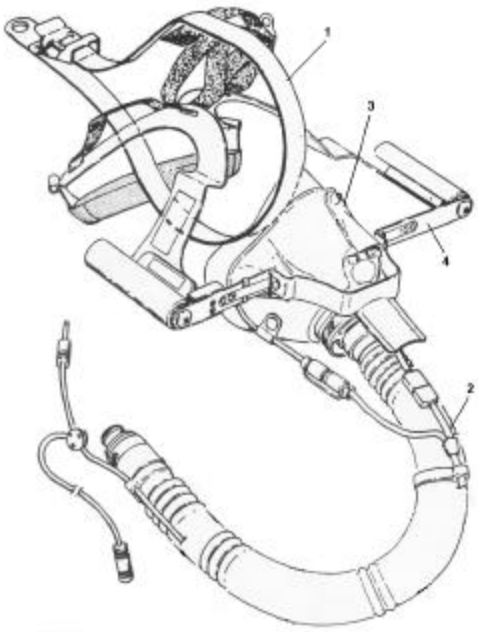

Figure 5-9 1506V Folding Quik-Don Mask

H.2. 1506V Folding Quik-Don Mask Sub-Assemblies

The 1506V folding quik-don mask consists of the following five sub-assemblies. (Refer to figure 5-9)

- Holder Strap (1)
- Valve, Hose, and Communication Assembly (2)
- Hardshell/Facepiece Assembly (3)
- Suspension Assembly (4)
- Goggle Assembly (not shown)

Continued next page

H.2. 1506V Folding Quik-Don Mask Sub-Assemblies (Continued)

The following is a continuation of the 1506V folding quik-don mask sub-assemblies.

Parts	Functions
Holding Strap	The holding strap (P/N 358-643E), provides secure mounting of the 1506V mask in the stowed position. The mask assembly can be automatically released from the holder assembly by pulling the mask assembly from the holder during the donning procedures.
Valve, Hose, and Communication Assembly	The valve, hose, and communication assembly consists of a combination inhalation/exhalation valve, which connects to the mask and hardshell assembly by means of a three pin bayonet connector. Attached to the valve assembly is a silicone oxygen hose terminating with a quick release connector with an integral disconnect warning device. The communication system consists of a microphone, cable and connectors.
Hardshell/Facepiece Assembly	**NOTE** All the hardshells will have a reinforcement metal strip in the nose ridge. The hardshell/facepiece assembly consists of a silicone facepiece attached to the hardshell by means of a receiver assembly. Attached to the anti-smoke goggles vent valve, vent valve guard and yoke attachment pins.
Suspension Assembly	The suspension assembly consists of a yoke, which is attached to the folding aluminum head-harness assembly by means of a telescoping retention system. The head-harness assembly includes a cushioned neck pad, head straps, and electrical switching system.
Goggle Assembly	The goggle assembly consists of a lens, frame, and headstrap. The frame and headstrap are made from silicone rubber. The lens is replaceable if it becomes scratched or damaged.

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H.3. 1506V Folding Quik-Don Mask Communications Capability

Full communication capabilities are provided when the folding quik-don mask assembly is connected to a set of headphones and the aircraft communication system. Microphone switching between the headset boom microphone and the mask microphone is initiated when the suspension is unfolded.

H.4. 1506V Folding Quik-Don Mask Operation

Refer to figure 5-10 during review of the 1506V folding quik-don mask operating procedures. Oxygen supply enters the face-piece through the valve located at the bottom of the mask. Exhaled air passes out through the same valve. The exhalation portion of the valve is constructed so that only a pressure of 1-millimeter of mercury greater than the inlet pressure being supplied by the regulator, will force open the valve and allow exhaled air to flow from the mask.

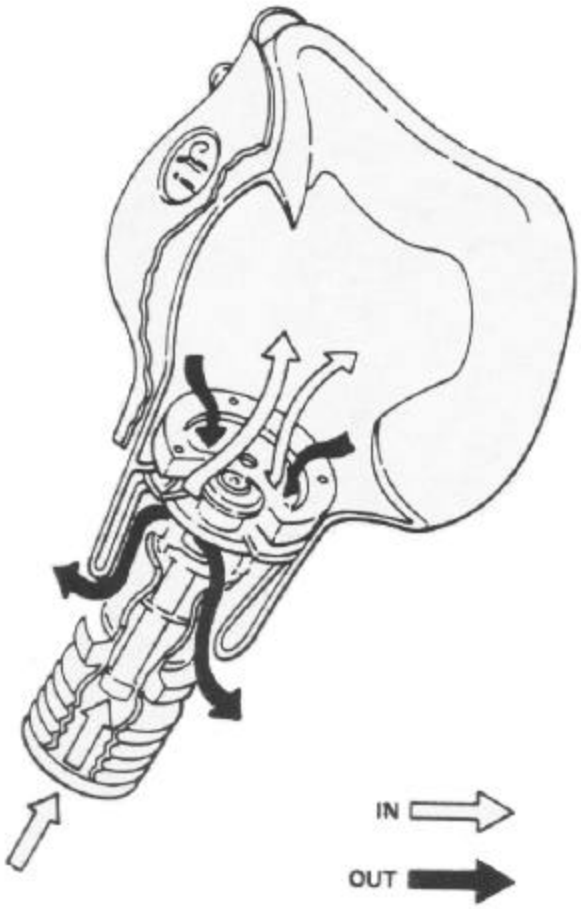

Figure 5-10 1506V Mask Operation

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H.5. 1506V Folding Quik-Don Mask Donning Procedures

Donning procedures for the 1506V folding quik-don mask are as follows:

WARNING

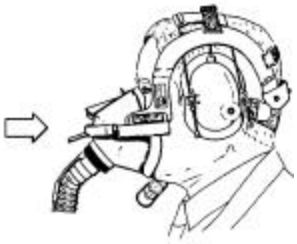
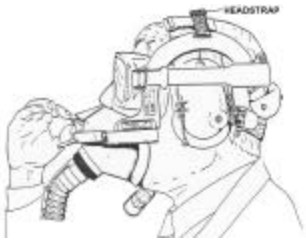
With the regulator in the OFF position the mask may allow ambient air to enter. Ensure regulator is in the ON position at all times during flight.

Step	Action	Example
1	Firmly grasp the folding quik-don mask assembly with one hand. Forefinger must be over yoke tab. Pull the mask down and away to release it from the quick release holder assembly.	
2	Place the mask assembly over the head until suspension nape pad contacts the base of the skull.	
3	**WARNING** Extend the mask far enough from the face to prevent the facepiece from dragging over the face as it is lowered into position. If the facepiece makes contact with the head or face during the donning procedure, it can roll up preventing the mask from seating properly. Sufficient tension should begin to be applied to the mask assembly so that the telescoping assembly is extended as the mask is brought down over the face,	

Continued next page

H.5. 1506V Folding Quik-Don Mask Donning Procedures (Continued)

The following is the continuation of the donning procedures for the 1506V folding quik-don mask:

Step	Action	Example
4	Position the mask directly over the nose and mouth. Release the tension on the yoke seating the mask on the face. Make any final adjustments to achieve a comfortable leak free fit.	
5	Verify that the oxygen delivery hose and the communication plugs are properly connected to the aircraft oxygen and communication systems. Verify that the regulator is set to the proper setting.	N/A
6	The headstrap of the suspension assembly may be adjusted for comfort, as required.	
7	If smoke is present in the aircraft, place the anti-smoke goggles over the face. The anti-smoke goggles should fit over the top of the mask hardshell. Verify that the vent valve is open. If not, open the vent valve by pulling on the vent valve knob. When the anti-smoke goggles are not in use, the vent valve shall be in the closed position.	

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H.6. 1506V Folding Quik-Don Mask Inspection Intervals

A Calendar Inspection (IAW MSR MPC) shall be performed upon issue and every 30 days thereafter. When a complaint is received regarding the operation of the mask, a calendar inspection shall be performed. The calendar inspection consists of the following tasks:

- Disassembly
- Inspection
- Cleaning
- Assembly
- Functional Test
- Sanitizing

H.7. 1506V Folding Quik-Don Mask Modifications

There are no modifications required/authorized for the 1506V folding quik-don mask at this time.

H.8. 1506V Folding Quik-Don Mask Troubleshooting

If a problem is encountered during the inspection, preflight/postflight inspection or during the operation of the mask assembly, refer to H.10. Locate the problem under the Trouble column and then refer across to the Probable Cause and Remedy columns. These tests are used to isolate the cause of trouble. Perform the isolation tests and corrective actions in the order specified.

After corrective actions have been completed proceed to the operational testing procedures provided in the MSR MPC..

H.9. 1506V Folding Quik-Don Mask Repairs

With the exception of repair to electrical assemblies, 1506V folding quik-don mask repairs are limited to replacement of defective parts in accordance with the MSR MPC.

Continued next page

H.10. 1506V Folding Quik-Don Mask Troubleshooting Guide

The following guide is a troubleshooting guide for the 1506V folding quik-don mask.

Trouble	Probable Cause	Test/Remedy
Poor/no communication (Section H.11 of this chapter provides repair information for the electrical assembly connections.)	• Defective Cable. • Loose microphone connections. • Defective microphone. • Defective microswitch. • Faulty aircraft system.	• Test continuity/replace cable. • Tight set screws. • Replace Microphone. • Replace microswitch. • Repair aircraft system.
Oxygen leakage	• Leakage between face and facepiece. • Leakage between hardshell and facepiece. • Leakage at facepiece. • External leakage at oxygen hose. • Leakage at valve/O-ring interface. • Leakage at oxygen hose. • Leakage between vent valve body and the facepiece.	• Adjust mask (to face) or headstrap for proper fit. • Leak test hardshell facepiece subassembly/torque retaining nut. • Leak test hardshell facepiece subassembly/replace facepiece. • Tighten hose clamps. • Replace O-ring. • Leak test hose/replace hose. • Replace if facepiece vent valve hole is too large/reseal with silicone adhesive.

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H.10. 1506V Folding Quik-Don Mask Troubleshooting Guide (Continued)

The following is a continuation of the troubleshooting guide for the 1506V folding quik-don mask.

Trouble	Probable Cause	Test/Remedy
High inhalation/ exhalation resistance	• Contaminated valve. • Defective valve flapper, diaphragm, or seat. • Defective oxygen connector. • Defective oxygen regulator (or system).	• Clean valve. • Replace valve. • Replace connector. • Repair aircraft regulator (or system).
Oxygen hose elongates excessively	• Cord and snap assembly broken	• Replace cord and snap assembly.
Restricted or uneven oxygen flow	• Contaminated valve, hose or connector. • Defective oxygen supply regulator (or system).	• Clean valve, hose or connector. • Repair aircraft regulator (or system).
Oxygen connector disengages from receptacle	• Defective oxygen connector.	• Replace connector.
Damaged, loose, worn or missing parts or assemblies	• Operator damage/normal wear.	• Replace as necessary.

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H.11. 1506V Folding Quik-Don Mask Electrical Assembly Repairs

If any of the electrical connections require repair, solder wire leads in accordance with Military Specification MIL-S-6872. Use SN60-W-AR solder conforming to Federal Specification QQ-S0571. If connectors are broken or corroded, replace with like connector (Type U-173/U or U-942/A). Refer to figure 5-11, and use the following procedures for electrical connection repairs.

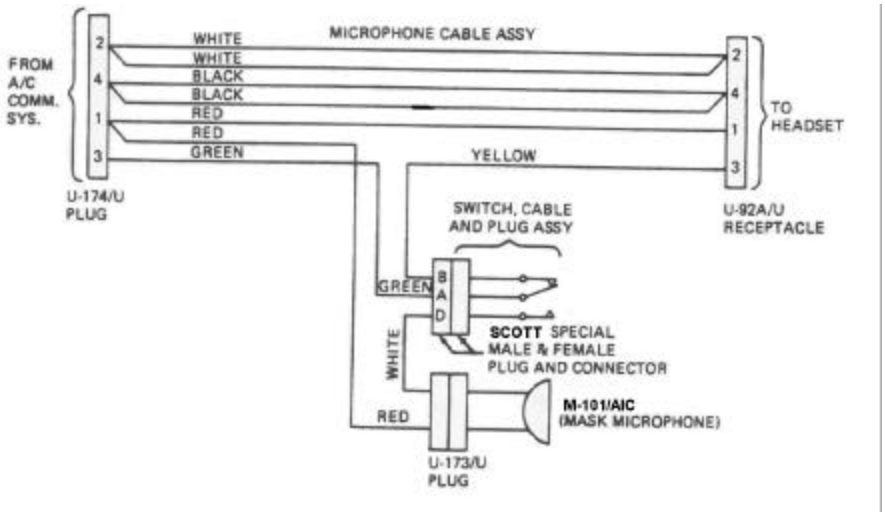

Figure 5-11 1506V Mask Electrical

Step	Action
1	Remove old connectors by cutting wire leads as close to terminal as possible.
2	**CAUTION** *Do not use acid-core solder or acid flux for electrical repairs.* Clean bare ends of wire and solder to new connector.
3	Ensure that solder connections are mechanically strong and electrically continuous.
4	Remove excess flux and loose solder.
5	Make sure there are no nicks in wire.

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H.12. 1506V Folding Quik-Don Mask Storage

The following are guidelines for storing the 1506V folding quik-don mask.

- After using a mask, wipe it clean and store in its approved container that will keep the mask clean, dry and lint-free.
- Masks are to be sanitized before storage.
- Stored masks must have ample ventilation and not be exposed to excessive heat or direct sunlight.
- The mask is not to be stored in an area where other flight gear will be stored on top of it.

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Section A. Rescue Equipment Overview

A.1. Rescue Equipment Introduction

This chapter contains information relating to rescue equipment. It is sectioned to reflect the different functions and equipment data, in addition to specific requirements for use by the Coast Guard. The Aviation Survival Technician has the responsibility of maintaining and servicing the aircraft rescue equipment.

A.2. Quality Assurance

CAUTION

In no case shall the Aviation Survival Technician perform their own quality assurance inspections.

The procedures detailed present a logical sequence for proper maintenance. Quality assurance steps are provided for critical operations. When a step is followed by **QA REQUIRED**, the Aviation Survival Technician shall perform the step and then have the authorized QA inspector perform the inspection.

A.3. Records

All rescue equipment shall be subjected to periodic inspections and maintenance. These tasks are the primary assurance of rescue equipment functioning properly and no instance of carelessness or willful neglect shall be allowed to pass unnoticed. Aviation Computerized Maintenance System (ACMS) and Mandatory Special Requirements (MSR) are used by the Aviation Survival Technician to provide a systematic means of control. The ACMS and MSR Maintenance Procedure Cards (MPC) provide a logical sequence for inspection and maintenance of equipment. Additionally they provide a REMARKS section to denote any maintenance performed on equipment.

NOTE

The REMARKS section shall be used when any discrepancy is found and corrected if repairable. The information provided in this section is critical in determining equipment reliability, failure trends, and maintenance intervals.

Section B. Folding Rescue Litter

B.1. Folding Rescue Litter Introduction

The folding rescue litter is a stainless steel stretcher designed to evacuate a single injured person from land or sea during rescue operations. The litter folds in half, which provides compact storage.

B.2. Folding Rescue Litter Configuration

The folding rescue litter (see figure 6-1) is a stretcher constructed of type 304 stainless steel tubing and weighs approximately 45 lbs. As an assembly the folding rescue litter consists of the following features.

- Folding Couplers: For ease of storage the litter can be folded by releasing the two couplers (top tube couplers are screw type with self-aligning pins, while the bottom skid tubes are a hook and pin type) at each side of the litter and folding the bottom half into the top.

- Flotation Collars and Chest Pads: The flotation collars and chest pads consisting of nylon covered polyethylene foam attached to the outside of the litter and to the chest strap provide flotation capability.

- 5-Pound Ballast Weight: A ballast weight provides counter weight stability so the litter will remain horizontal with a patient in the litter.

- Removable Hoisting Slings: Hoisting slings provide the means to attach the litter to the helicopter hoist cable.

- Patient Restraint Straps: Five patient restraint straps are provided for use in conjunction with the chest pad, for restraining a patient including chest pad.

- Patient lift insert: A patient lift insert is attached inside the litter frame to provide rapid and easy removal of patient from the litter.

NOTE

Two wool blankets, rolled and placed at the foot of the litter, enable the attendant to cover the patient, thus providing warmth during hoist and flight. This eliminates the need for the crewman to unstrap and cover the patient once aboard the aircraft.

Continued next page

B.2. Folding Rescue Litter Configuration (Continued)

The following is a continuation of the folding rescue litter configuration.

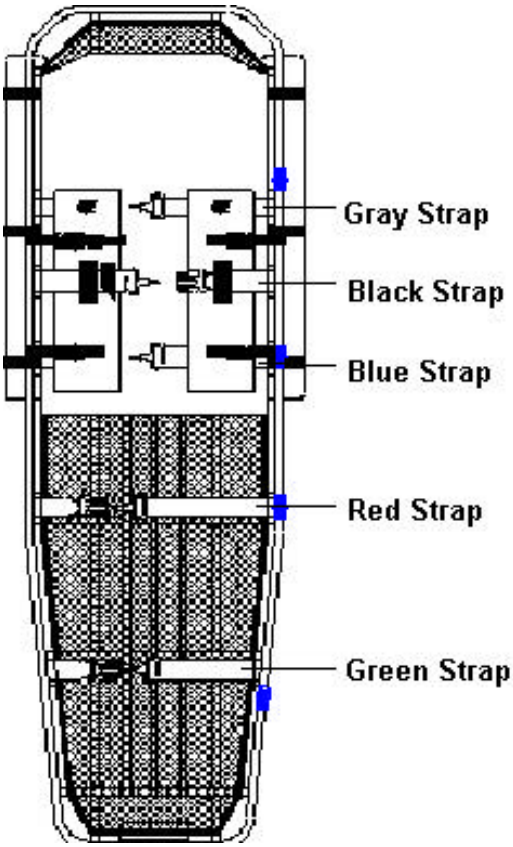

Figure 6-1 Folding Rescue Litter

B.3. Folding Rescue Litter Function

The folding rescue litter can be unfolded, locked, then lowered from and hoisted to a helicopter by means of a hoist cable in land/sea rescue operations.

B.4. Folding Rescue Litter Optional Equipment

A shield may be installed on the folding rescue litter to provide protection for a patient's head from potential injury caused by hitting the bottom of the aircraft.

Continued next page

B.5. Folding Rescue Litter Inspection Intervals

Inspection of the folding rescue litter will be in accordance with the applicable MSR MPC. The following are inspection intervals for the folding rescue litter:

- The acceptance inspection (load test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual/post-usage inspection will be performed at intervals not to exceed 90 days.
- The load test will normally be performed at intervals not to exceed 180 days.

B.6. Folding Rescue Litter Repairs

There are no modifications authorized to the folding litter. Repairs are limited to the replacement of litter components in accordance with applicable MSR MPC.

WARNING

The only authorized replacement sling is the Lifesaving System Corp. hoisting sling P/N 193.

NOTE

If the fluorescent dye penetrant inspection (performed when there are known or suspected cracks) reveals cracks, return the litter to ARSC (NRFI) for repair. Ensure broken or cracked welds are clearly marked.

Section C. Medevac Board

C.1. Medevac Board Introduction

The medevac board is a stainless steel backboard designed to stabilize a patient who has or may have a back or neck injury. The medevac board folds in half, which provides compact storage.

C.2. Medevac Board Configuration

The medevac board is a two-piece, full length, stainless steel backboard, which weighs approximately 19 lbs. It is designed for compact stowage and shaped to fit inside the folding rescue litter. The medevac board is easily separated into halves for space-saving storage and is equipped with a protective storage/carrying case. The board halves are constructed with stainless steel screw couplers for strength and rigidity. Constructed of stainless steel, the medevac board offers a load capacity in excess of 300 lbs. The nonporous surface makes it easy to clean and impervious to blood and other body fluids. Strategically placed oversized, replaceable hand straps make it easy to carry and maneuver. Additionally, board has replaceable color-coded patient restraint straps featuring quick-close buckles and a disposable head restraint.

C.3 . Medevac Board Function

WARNING

When using the medevac board, all patient restraint straps shall be used.

CAUTION

The medevac board has no flotation capability and is not attached to the rescue litter. Therefore, to prevent the loss of the medevac board do not use it when strapping a person into the litter while they are still in the water.

The medevac board is ideally suited for stabilizing and removing a patient from a confined space to an area where the patient may be prepared for a litter hoist.

Continued next page

C.4. Medevac Board Inspection Intervals

Inspection of the medevac board will be in accordance with the procedures in chapter 6, section C.5. The following are inspection intervals for the medevac board:

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual/post-usage inspection will be performed at intervals not to exceed 90 days.

NOTE

Tracking and documentation of inspections shall be performed at the unit level since the medevac board is not in the MSR system.

C.5. Medevac Board Inspection

Medevac Board visual and post/usage inspections shall be performed using the following procedures:

Step	Action
1	Inspect panels, frame, and couplers for cleanliness, corrosion, security, and proper operation.
2	Inspect patient restraint straps, handle straps, and foot strap, for excessive wear, cleanliness, cuts, and proper operation.
3	Inspect disposable head restraint for cleanliness and damage. **NOTE** The disposable head restraint shall be replaced after each use.
4	Inspect protective storage/carrying case for excessive wear, cleanliness, and cuts.

C.6. Medevac Board Repairs

There are no modifications authorized to the medevac board. Repairs are limited to the replacement of medevac board components.

Section D. Multi-Jointed (M/J) Rescue Basket

D.1. M/J Rescue Basket Introduction

The M/J rescue basket is intended for hoisting survivors from land or sea during helicopter rescue operations.

D.2. M/J Rescue Basket Configuration

The M/J rescue basket (see figure 6-2) is constructed of type 304 stainless steel tubing with drain holes provided on the bottom tubing for water drainage. The design of the basket eliminates sharp corners by incorporating large radii, thus minimizing the potential for puncturing the skin of the aircraft during operation. The M/J rescue basket weighs approximately 39 lbs. As an assembly, the M/J rescue basket consists of the following features.

- Flotation Tubes: Two nylon covered Etha-foam floats silk-screened with "Remain Seated" provide the M/J basket with flotation capability.

- Folding Bail: The bail is a folding assembly of tubing and cable that hinge at all four corners to provide inward folding of the bail.

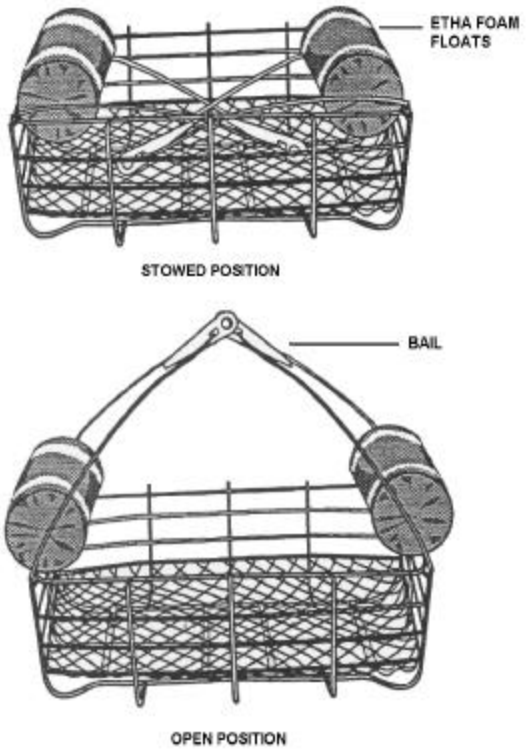

Figure 6-2 M/J Rescue Basket

Continued next page

D.3. M/J Rescue Basket Function

CAUTION

When attaching or removing the M/J rescue basket to the hoist hook, place a hand under both bails to prevent them from falling on the individual in the rescue basket.

The M/J rescue basket is lowered to personnel from a helicopter by means of a hoist cable during rescue operations.

D.4. M/J Rescue Basket Inspection Intervals

Inspection of the M/J rescue basket will be in accordance with the applicable MSR MPC. The following are inspection intervals for the M/J rescue basket:

- The acceptance inspection (load test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual/post-usage inspection will be performed at intervals not to exceed 30 days.
- The load test will normally be performed at intervals not to exceed 180 days.

D.5. M/J Rescue Basket Repairs

There are no modifications authorized to the M/J rescue basket. Repairs are limited to the replacement of basket components in accordance with applicable MSR MPC.

NOTE

If the fluorescent dye penetrant inspection (performed when there are known or suspected cracks) reveals cracks, return the basket to ARSC (NRFI) for repair. Ensure broken or cracked welds are clearly marked.

Section E. Survivor's Strop

E.1. Survivor's Strop Introduction

The survivor's strop is a buoyant device designed for use in hoisting a single survivor during helicopter rescue operations.

E.2. Survivor's Strop Configuration

The survivor's strop (see figure 6-3) is a buoyant device consisting of closed cell foam encased in a red cover of 1050 denier nylon ballistic cloth. Webbing, woven through the cover of the sling, is attached to the helicopter rescue hook by the two V-rings terminating both ends. Two retainer strops, one long terminated by a friction V-ring and one short terminated by a snap hook, are secured by three webbing straps with snap fasteners. All hardware is stainless steel.

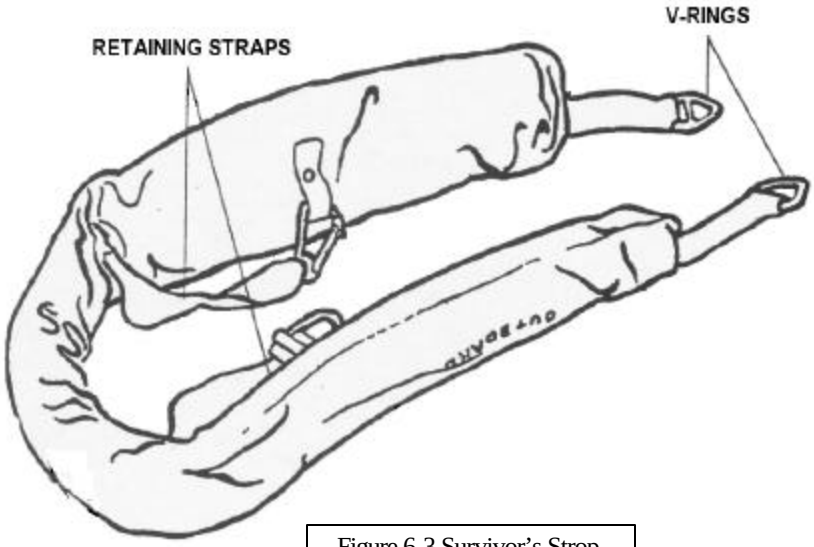

Figure 6-3 Survivor's Strop

E.3. Survivor's Strop Function

WARNING

Use of chest retainer straps is mandatory during use of the survivor's strop, except when hoisting Rescue Swimmers.

The survivor's strop is a rescue device used to hoist trained (military) personnel only. The strop can accommodate one survivor wearing the usual flight gear, integrated torso harness, and life preserver.

Continued next page

E.4. Survivor's Strop Inspection Intervals

Inspection of the survivor's strop will be in accordance with the applicable MSR MPC. The following are inspection intervals for the survivor's strop:

- The acceptance inspection (load test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual/post-usage inspection will be performed at intervals not to exceed 30 days.
- The load test will normally be performed at intervals not to exceed 180 days.

E.5. Survivor's Strop Repairs

There are no modifications authorized to the survivor's strop. The only authorized repairs to the survivor's strop are re-stitching of webbing threads and the repair and re-stitching of fabric covering using "E" thread or 3 cord where applicable using 6-8 SPI in accordance with applicable MSR MPC.

Section F. Quick Strop

F.1. Quick Strop Introduction

The quick strop will be used in conjunction with the Tri-SAR harness for rescuing survivors.

F.2. Quick Strop Configuration

The quick strop (see figure 6-4) is similar in design and materials to the survivor's strop with some minor differences. The quick strop is longer and has a friction slide to snug the strop to the survivor.

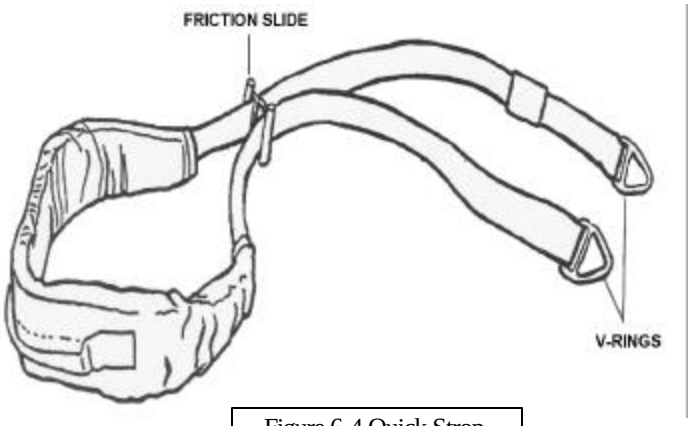

Figure 6-4 Quick Strop

F.3. Quick Strop Function

WARNING

The crotch strap shall be utilized at all times when survivor is unconscious, unresponsive, or incapacitated.

CAUTION

Whenever possible, the quick strop should be placed on a survivor so they will be facing the rescue swimmer during hoisting.

The quick strop is utilized by the rescue swimmer for a quicker recovery of survivors or when the rescue area is restrictive i.e., cliff rescue. The rescue swimmer, while wearing the Tri-SAR harness, is lowered to the survivor. The rescue swimmer wraps the quick strop underneath the arms of the survivor, tightens the friction slide, routes and secures the crotch strap if needed for unconscious, unresponsive, or incapacitated survivors, and is then hoisted up to the helicopter with survivor.

Continued next page

F.4. Quick Strop Inspection Intervals

Inspection of the quick strop will be in accordance with the applicable MSR MPC. The following are inspection intervals for the quick strop:

- The acceptance inspection (load test) will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual/post-usage inspection will be performed at intervals not to exceed 90 days.
- The load test will normally be performed at intervals not to exceed 180 days.

F.5. Quick Strop Repairs

There are no modifications authorized to the quick strop. The only authorized repairs to the quick strop are re-stitching of webbing threads and the repair and re-stitching of fabric covering using “E” thread or 3 cord where applicable using 6-8 SPI in accordance with applicable MSR MPC.

Section G. CG-P1 Portable Salvage Pump

G.1. CG-P1 Portable Salvage Pump Introduction

Description, Maintenance and Modifications shall be in accordance with Coast Guard Rescue and Survival Systems Manual, COMDTINST M10470.10 (series).

G.2. CG-P1 Portable Salvage Pump Inspection Intervals

Inspection of the CG-P1 will be in accordance with the applicable MSR MPC. The following are inspection intervals for the CG-P1:

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual inspection will be performed at intervals not to exceed 30 days.
- The test-run inspection will be performed at intervals not to exceed 60 days.
- The servicing will be performed at intervals not to exceed 180 days.

Section H. Helicopter Trail Line/Weight Bag Assembly

H.1. Trail Line/ Weight Bag Assembly Introduction

The trail line is used in helicopter operations when normal hoisting methods are not practical. The use of eye splices and snap hooks allows the connection of two trail lines together to form a 210 foot trail line, if required. If severe winds are encountered, more weight bags can be added to provide stability.

H.2. Trail Line/ Weight Bag Assembly Configuration

The trail line consists of 105 feet of orange polypropylene line with a weak link and snap hook at one end and a snap hook at the other end. A 5-pound weight bag, made of nylon webbing and filled with size 8 lead shot or lead wool, is attached to the trail line snap hook.

H.3. Trail Line/ Weight Bag Assembly Function

The trail line is used to reduce the time the pilot is required to maintain a precise stable hover without a reference. In addition, the trail line prevents wide swinging while hoisting and guides the rescue device to and from the helicopter. A weak link is provided to break at 300 pounds preventing damage to the rescue equipment and/or helicopter. The weight provides for a better delivery method of the trail line by reducing wind and rotorwash effect on the line.

H.4. Trail Line Fabrication

To fabricate the trail line, with weak link, proceed as follows:

Materials Required:
- Polypropylene line 5/16 inch circumference
- Type III Nylon Cord
- Snap Hook, P/N 364, (Life Saving Systems Corp., 220 Elsberry Rd., Apollo Beach, FL. 33572)

Step	Action
1	Measure and cut 107 feet of polypropylene line.
2	At one end, splice a snap hook onto the line using a 3-inch eye splice with a minimum of 4 tucks. Trim and sear off excess line.
3	At opposite end, splice a 3-inch eye without snap hook. **NOTE** Eye splice without snap hook is for addition of weak link.

Continued next page

H.4. Trail Line Fabrication (Continued)

The following is a continuation of the trail line with weak link fabrication procedures.

Step	Action
4	Measure and cut one 18-inch length of Type III nylon cord. Remove and discard inner core lines. Sear cut ends of sleeve.
5	Pass end of nylon cord through trail line eye splice and through snap hook.
6	Form a loop by tying bitter ends with an overhand knot, leaving approximately 2 inches on each bitter end.

H.5. Weight Bag Fabrication

To fabricate the weight bag, proceed as follows:

Materials Required:
- Type IV nylon webbing yellow 1 1/2” NSN 8305-00-262-1665
- Type IX nylon, O D green 3” NSN 8305-00-655-5124
- Reflective tape, cloth, silver 2” NSN 9930-00-481-3424
- Brass ring NSN 5340-00-275-5484 (halyard clip and ring assembly)
- Lead shot size #8 (commercially procured), or lead wool NSN 5330-00-171-6545
- Thread “E” black, thread “FF” black

Figure 6-5 Weight Bag

Continued next page

H.5. Weight Bag Fabrication (Continued)

The following is a continuation of the weight bag fabrication procedures.

Step	Action
1	Cut a 24 ½inch length of cloth reflective tape.
2	Sear cut a 25-inch length of type IX webbing.
3	Center reflective tape on top of webbing, positioning it ¼-inch from the ends.
4	Sew up each long side of the webbing 1/8-inch from the edge using “E” 8-10 SPI. See figure 6-5.
5	Sear cut an 8-inch length of type IV webbing.
6	Reeve one bitter end of type IV through brass ring.
7	Weigh out 4 ¾lbs. of lead shot or lead wool. Place lead into the sewn type IX.
8	Insert 2 inches of the ring strap into the bag opening.
9	Close the bag using a 1 ½inch double “W” sewn across the width of the bag using “E” thread at 8-10 SPI. See figure 6-5.

Section I. Message Block

I.1. Message Block Introduction

The message block is used to communicate with individuals when no other means of communications are available.

I.2. Message Block Configuration

The message block is a 5-inch by 6 ½inch plastic pouch that has a 7-foot vinyl streamer attached. The pouch has a pressure lock seal to keep water out and the message in and a smaller inner bag of sand for weight. The streamer is used to stabilize and slow the message block during its descent when deployed from an aircraft.

I.3. Message Block Function

The message block may be deployed to a vessel in distress, giving instructions to survivors on how to prepare for their rescue or to inform individuals on land or at sea of severe weather, forest fire, or tsunami.

I.4. Message Block Modifications

Before placing the message block into any aircraft, the installation of a 3-inch by ½inch piece of closed cell foam into the pouch is required. The closed cell is used to aid in flotation should it be necessary to deploy the message block into the water.

Section J. Hoist Quick Splice

J.1. Hoist Quick Splice Introduction

The hoist quick splice is a device used by rescue personnel in the event the hoist cable has been cut, broken, or has become frayed.

J.2. Hoist Quick Splice Configuration

The hoist quick splice (see figure 6-6) consists of a plate which is constructed of ¼-inch aluminum. Numbered grooved slots are provided in the plate for rapid routing of a hoist cable, and a standard rescue hook is attached to the plate with a stainless steel shackle. A spring clip is provided in slot #5 for locking the hoist cable into place.

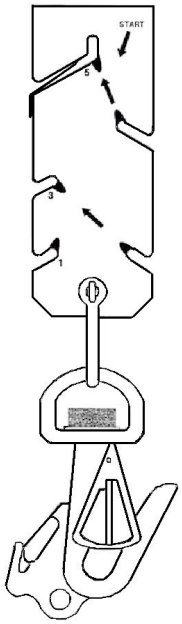

Figure 6-6 Hoist Quick Splice

NOTE

Cable slots 1, 3 and 5 are stamped on one side of the plate, and slots 2 and 4 on the opposite side.

J.3. Hoist Quick Splice Function

WARNING

After the cable is cut, the strands may separate. Use care handling the cable to prevent injury from sharp ends.

Continued next page

J.3. Hoist Quick Splice Function (Continued)

WARNING

If the hoist cable is not inserted completely into slot # 5 (to engage the retaining clip), it will unravel during hoisting.

CAUTION

With the quick splice installed, the hoist up-limit switch may not stop hook from damaging the hoist.

To use the hoist quick splice, route the hoist cable into each slot (following the engraved directional arrows) beginning at the START position.

J.4. Hoist Quick Splice Inspection Intervals

Inspection of the hoist quick splice will be in accordance with the applicable MSR MPC. The following are inspection intervals for the hoist quick splice:

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The weekly inspection shall consist of verification of overall condition, and spray with Fluid Film as needed (wipe off excess).
- The visual inspection will be performed at intervals not to exceed 3 months.

J.5. Hoist Quick Splice Repairs

There are no modifications authorized to the hoist quick splice. The only authorized repairs to the hoist quick splice are re-removal of corrosion, burrs, and sharp edges with emery cloth in accordance with applicable MSR MPC.

Section K. Aircraft Safety Belts

K.1. Aircraft Safety Belt Introduction

Aircraft safety belts (commonly referred to as "Gunner's Belts") are designed as safety restraint systems for use whenever crewmembers and passengers are not strapped in a seat and a door, ramp, or hatch is open.

K.2. Aircraft Safety Belt Configuration

Each aircraft safety belt is made of nylon or dacron webbing and is provided with pull tabs and adapters for adjustment. All aircraft safety belts have a latch and link assembly with a leather protector. The following are the only authorized types of aircraft safety belts used.

- Rotary-Wing Aircraft Safety Belt: NSN 1680-00-211-7356, P/N MS-16070-2. The rotary-wing aircraft safety belt is different from the fixed-wing belt in that it has a quick connector snap-hook (P/N MS22044-1) for anchoring the wearer to the airframe, additionally the buckle does not have the latch lock installed.

- Fixed-Wing Aircraft Safety Belt: NSN 1680-01-HR1-2562, P/N 550-30. The fixed-wing aircraft safety belt is different from the rotary wing harness in that it has a static line type snap-hook for anchoring the wearer to the airframe, additionally, it has a buckle latch lock (see figure 6-7). This lock prevents inadvertent opening of the buckle while it is being worn.

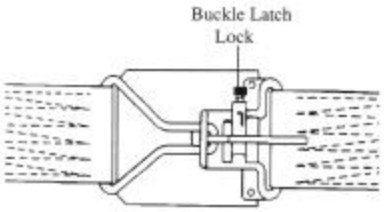

Figure 6-7 Fixed-Wing Buckle Latch Lock

K.3. Aircraft Safety Belt Inspection

CAUTION

Since nylon and dacron type aircraft safety belts have no shelf/service life and do not require field testing, extreme caution and thoroughness must be exercised during the calendar/special inspections and required maintenance procedures.

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.

Continued next page

K.3. Aircraft Safety Belt Inspection (Continued)

The following is a continuation of the aircraft safety belt inspection.

- A visual inspection will be performed at intervals not to exceed 30 days.

NOTE

Aircraft safety belts issued to Rescue Swimmers shall be visually inspected each duty day.

- A rotary-wing safety belt post/usage inspection (saltwater environment only) shall be performed after each use. This inspection includes rinsing with fresh tap water and air drying, in addition to all visual inspection procedures.

To perform a visual inspection, proceed as follows:

Step	Action
1	Examine webbing for fading of fabric, wear, fraying, rot, broken stitches, or cuts.
2	Examine all hardware for security or attachment, corrosion, cracks, wear, and ease of operation.
3	Lubricate all hardware with a fine coat of fluid film.
4	Inspect usage identification markings for the following: • If belt is used in fixed-wing aircraft then ensure that: - "FIXED-WING ONLY" is stenciled in 1-inch yellow letters on both front sides of belt and both sides of the tail line. • If belt is used in rotary-wing aircraft then ensure that: - "ROTARY-WING ONLY" is stenciled in 1-inch yellow letters on both front sides of belt and both sides of the tail line.

Continued next page

K.4. Aircraft Safety Belt Repairs

There are no modifications authorized to aircraft safety belts. Repairs are limited to the removing corrosion with emery cloth. Damaged aircraft safety belts shall be scrapped immediately.

Section L. Emergency Recovery Device

L.1. Emergency Recovery Device (ERD) Introduction

Emergency Recovery Device (ERD) is designed to recover the rescue swimmer in the event the rescue hoist (HH-60J only) becomes unusable and no other means is available to recover the rescue swimmer.

L.2. Emergency Recovery Device (ERD) Configuration

As an assembly, the ERD (see figure 6-8) consists of the following features.

- Skyhook Base Plate Assembly: The skyhook base plate assembly consists of the base plate, roller guide assembly, and capstan speed winch with removable handle.

- Prusik Minder Pulley System: A prusik minder pulley is a pulley that is housed in a metal sheaf, this sheaf prevents the line from popping off the pulley if the rescue swimmer is spinning or swinging back-and-forth. A prusik cord is used as a safety device, which allows the line to pass through the prusik knot in one direction (such as a one-way check valve).

- Miscellaneous Equipment: Additional equipment includes 100 feet of ½inch Kernmantle rope, stainless steel caribiner, hold down brackets, and storage bags floating handle.

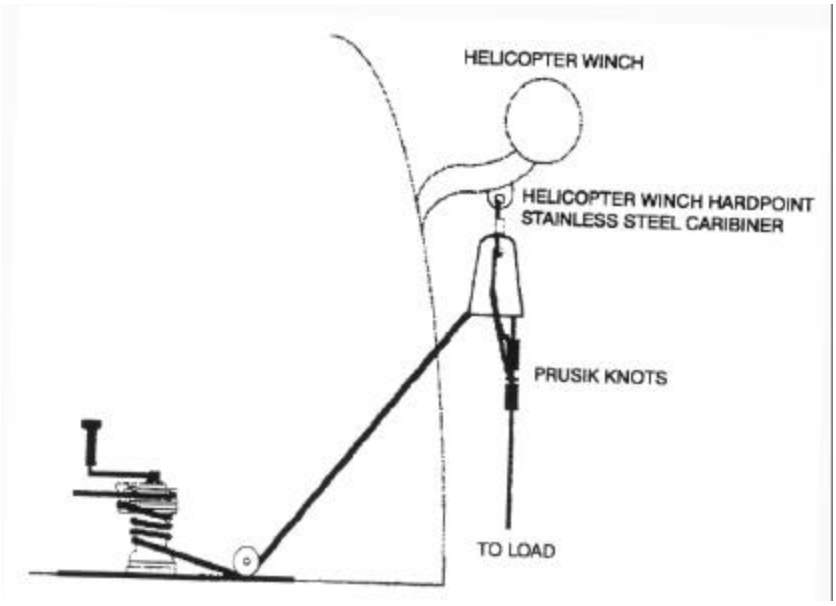

Figure 6-8 ERD System

Continued next page

L.3. Emergency Recovery Device (ERD) Function

NOTE

The ERD was designed to recover rescue swimmers. This does not prevent it from being used to recover survivors. However, it is an extremely demanding maneuver for the flight mechanic. Aircrews should fervently consider alternate means of recovery.

Use of the ERD is extremely demanding for the flight mechanic. It requires keen coordination between the pilot and the flight mechanic to reduce the workload. When the ERD is properly rigged, approximately 90 feet of useable line is available. The maximum hoisting weight for the ERD is 300 pounds. Procedures for operating the ERD system can be found in C.G.T.O. 1H-60J-1, Flight Manual, chapter 9.

L.4. Emergency Recovery Device (ERD) Inspection

Inspection of the ERD will be in accordance with the applicable MSR MPC. The following are inspection intervals for the ERD:

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual/post-usage inspection will be performed at intervals not to exceed 180 days.
- The annual lubrication will be performed at intervals not to exceed 365 days.
- The ERD line will be replaced at intervals not to exceed 36 months.

L.5. Emergency Recovery Device (ERD) Repairs

There are no modifications authorized to the ERD. Repairs are limited to the replacement of parts and components in accordance with applicable MSR MPC.

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Section A. Protective Equipment Overview

A.1. Protective Equipment Introduction

This chapter contains information relating to protective equipment. It is sectioned to reflect the different functions and equipment data, in addition to specific requirements for use by the Coast Guard. The Aviation Survival Technician has the responsibility of issuing and repairing protective equipment.

A.2. Issue and Return of Protective Equipment

All flight clothing and equipment will be issued in accordance with the minimum equipment list found in enclosure 6 of this manual. All protective equipment issues and returns will be documented. Disposition of flight clothing will be in accordance with the policies set forth in chapter 12-B of the Coast Guard Personnel Manual, COMDTINST 1000.6 (series). It is the responsibility of the AST Shop to forward each aircrew member's CG Form-538 (see enclosure 1) to his or her next duty station upon transfer.

A.3. Inspections and Maintenance

All protective equipment will be inspected by an AST at intervals not to exceed 360 days. In addition to these inspections, all protective equipment shall be subjected to periodic maintenance. These tasks are the primary assurance of protective equipment functioning properly and no instance of carelessness or willful neglect shall be allowed to pass unnoticed.

A.4. Maintenance Records

For some of the protective equipment the Aviation Computerized Maintenance System (ACMS) and Mandatory Special Requirements (MSR) are used by the Aviation Survival Technician to provide a systematic means of control. The ACMS and MSR Maintenance Procedure Cards (MPC) provide a logical sequence for inspection and maintenance of equipment. Additionally, they provide a REMARKS section to denote any maintenance performed on equipment.

NOTE

The REMARKS section shall be used when any discrepancy is found and corrected if repairable. The information provided in this section is critical in determining equipment reliability, failure trends, and maintenance intervals.

Continued next page

A.5. Quality Assurance

CAUTION

In no case shall the Aviation Survival Technician perform their own quality assurance inspections.

The procedures detailed present a logical sequence for proper maintenance. Quality assurance steps are provided for critical operations. When a step is followed by **QA REQUIRED**, the Aviation Survival Technician shall perform the step and then have the authorized QA inspector perform the inspection.

Section B. Summer Flyer's Coverall

B.1. Summer Flyer's Coverall Introduction

The summer flyer's coverall is designed to be worn as an outer garment in warm temperature zones and to provide protection in the event of an aircraft fire. The only authorized color is blue. If necessary, commercial procurement is authorized.

B.2. Summer Flyer's Coverall Configuration

The summer flyers coveralls (see figure 7-1) are a one piece, unlined garment fabricated from polymide cloth, which is high temperature resistant and inherently flame-retardant synthetic fabric with no hot melt point or drip characteristics. The fabric is light in weight, will not support combustion, but will begin to char at 700 °F to 800 °F. The fabric has good abrasion resistance similar to nylon and is also non-absorbent like nylon and other synthetic fabrics. Because of this characteristic, cotton underwear (V-neck or Crew-neck T-shirt) should be worn under the coverall for optimum comfort. The summer flyer's coveralls are supplied in 14 sizes from 36 short to 48 long. Incorporated into the coverall is a slide fastener front closure, a bi-swing back, and a hook and pile fastener tape adjustment on each arm terminal. Also included are two breast pockets, one multiple pencil compartment on the left sleeve, two thigh pockets, and two lower leg pockets.

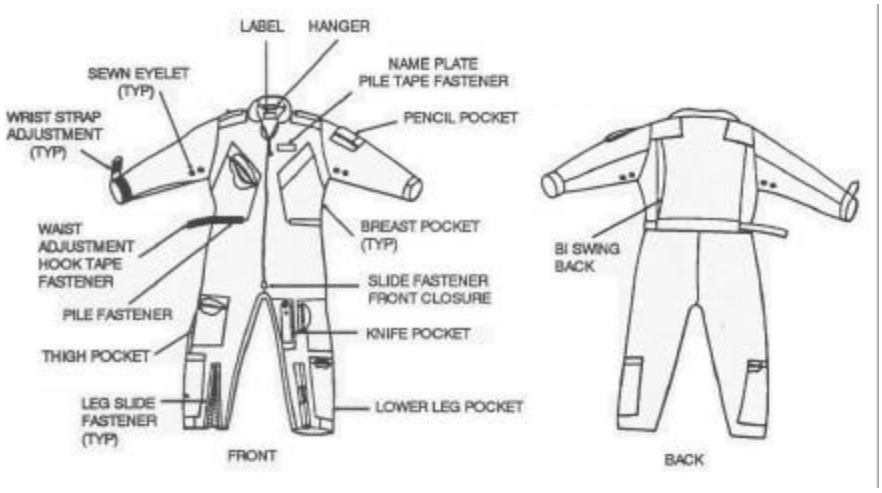

Figure 7-1 Summer Flyer's Coverall

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B.3. Summer Flyer's Coverall Application

The summer flyer's coverall is designated for use by all aircrew on all flights in Coast Guard aircraft except as directed by Commandant USCG. These coveralls are not supplemental uniform clothing and shall be worn only while in the performance of flight duties (assigned B-0 Ready, or awaiting scheduled operational and maintenance test flights).

B.4. Summer Flyer's Coverall Fitting

The summer flyer's coveralls are fitted to the aircrew member and normally correspond to their suit size. The coverall is used with standard Coast Guard personal survival equipment.

WARNING

To provide maximum fire protection, all slide fasteners shall be closed to their maximum length. Sleeves of the coveralls shall always be closed at the wrist, over glove cuff.

B.5. Summer Flyer's Coverall Modifications

Modifications to the summer flyer's coveralls are limited to addition of required patches (see figure 7-2). To attach patches to flyer's coveralls, proceed as follows:

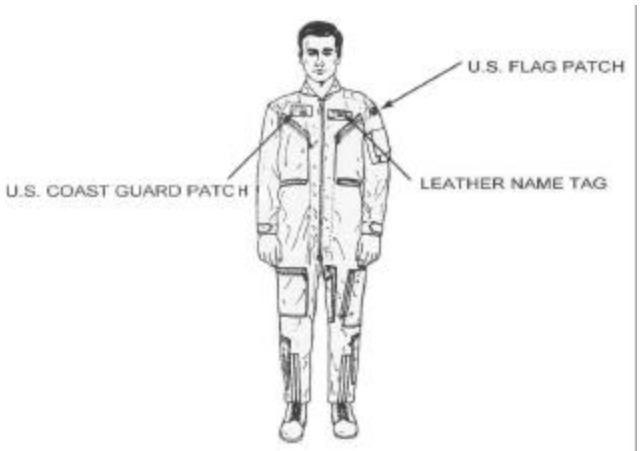

Figure 7-2 Summer Flyer's Coverall Patch Placement

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B.5. Summer Flyer's Coverall Modifications (Continued)

The following is a continuation of the attachment of patches to flyer's coveralls procedures.

Step	Action
1	U.S. Flag (2 ½" x 3 ½") shall be centered and attached to the upper left sleeve, below shoulder seam.
2	C.G. Logo (2 ½" x 3 ½") shall be centered and attached above the right breast pocket.
3	Officer's Rank Insignia - Attach cloth embroidered rank insignia to flyer's coveralls so that the outer edge of each insignia is placed 3/4 inch from the squared end of the epaulet (or shoulder seam if no epaulet). The size of the insignia should be equivalent to the metal shoulder grade insignia currently authorized in the Uniform Regulations, COMDTINST M1020.6 (series).
4	Optional: • Rescue Swimmer, EMT, or Unit patch, if worn, shall be centered and attached to the upper right sleeve, below shoulder seam and should not exceed 5 inches in diameter. • Unit identification patches, if worn, shall be centered and attached to the upper right sleeve, below shoulder seam and should not exceed 5 inches in diameter. **NOTE** Unit identification patches may not be purchased with government funds. **NOTE** The Commanding Officer shall evaluate the local area OPSEC environment when deciding whether to allow the wearing of unit patches. Where OPSEC is questionable, patches should be affixed with hook and pile material.

Continued next page

B.6. Fabrication of Standardized Leather Name Tag

NOTE

Only leather name tags are authorized to be worn on the summer flyer's coveralls, aircrew anti-exposure coveralls, and flight jacket.

For personnel identification, standardized leather name tag (see figure 7-3) shall be worn on the summer flyer's coveralls. To fabricate a leather name tag, proceed as follows:

Figure 7-3 Leather Name Tag

Materials Required:
- Leather Fr. Black NSN 8330-00-254-3009
- 23 KT Gold Foil
- 18 PT News Gothic Caps
- Pilot Wings, SAC Wings, C.G. Insignia Stamp Die
- Kingsley Stamp Machine

Step	Action
1	Cut three or four 2-inch by 4-inch leather patches using square, straight edge and sharp knife/razor.
2	Set up gold stamp materials in accordance with the manufacturer's instruction manual.
3	Print name tags in accordance with the manufacturer's instruction manual.
4	Attach hook tape (clear plastic optional) as required.

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B.7. Summer Flyer's Coverall Repairs

Repairs shall be restricted to open seams, small holes or tears, replacement of hook and pile fastener tape using "E" thread at 6 - 8 SPI.

NOTE

Only high temperature resistant cloth, MIL-C-81280 and high temperature resistant thread, MIL-T-83193, shall be used for repairs.

B.8. Summer Flyer's Coverall Care and Cleaning

It is recommended that a new coverall be laundered prior to use in order to soften the fabric and eliminate any possible skin irritation that might occur due to original fabric harshness. The fabric is a drip-dry type requiring no special handling and may be washed as frequently as needed. The coverall may be laundered at home or in a commercial type washer and dryer.

Step	Action
1	Wash in water up to 140 °F maximum. **NOTE** To reduce "piling" of fabric, the coveralls should be laundered inside out.
2	Use of a commercial fabric softener in the rinse will remove body oils during the laundering process. The fabric softeners also serve to inhibit static generation.
3	After tumble-drying or during drip drying, the coverall should be hung on a wooden hanger.
4	After each third laundering, the coveralls should be dry cleaned. Dry cleaning or laundering will not compromise the flame-retardant properties, and no renewable flame-retardant treatment is required. **NOTE** Coveralls, which are heavily soiled and/or stained with oil or grease, may be cleaned with solvents normally used in commercial dry cleaning establishments.
5	Ironing or pressing is permissible; however, it is difficult to remove wrinkles or creases due to the high temperature-resistant qualities of the material.

Section C. Sunglasses, HGU-4/P

C.1. Coast Guard Sunglasses Policy

Commandant (G-WKH) identified a potential flight safety hazard in the use of other than military issue, regular, or prescription sunglasses. Supporting documentation included reports of color and shape distortion resulting from discoloration of sunglasses lens. After closer investigation. the conclusion was reached that defective lenses in sunglasses can effect aircraft maintenance and preflight, as well as, in-flight duties.

In the interest of safety, all Coast Guard aviation personnel who wear sunglasses (regular or prescription) while conducting aircraft maintenance, or performing flight duties will limit sunglass type to standard military issue only.

C.2. Sunglasses, HGU-4/P Configuration

The HGU-4/P sunglasses (see figure 7-4) consist of a metal frame, clear acetate nose pads, temple tips, and high quality, ophthalmic crown glass lenses of neutral density. They are carried in a crush-resistant carrying case.

Figure 7-4 HGU-4/P Sunglasses

C.3. Sunglasses, HGU-4/P Application

CAUTION

Aviator's sunglasses are shatterproof but are not break-proof and do not provide an unbreakable shield against eye injury.

The HGU-4/P sunglasses provide general-purpose protection against sun glare.

C.4. Sunglasses, HGU-4/P Fitting

The HGU-4/P sunglasses are fitted to the individual by adjusting the nose pads and temples to the individual's comfort.

NOTE

Prescription sunglasses are available through the medical department.

Continued next page

C.5. Sunglasses, HGU-4/P Cleaning

To clean the HGU-4/P sunglasses, steam the lenses with your breath and dry with a high quality lens tissue. The lenses may be washed with warm water if extremely dirty.

C.6. Sunglasses, HGU-4/P Repairs

The only authorized repairs to the HGU-4/P sunglasses are as follows:

- Temple replacement: Use Frame, Spectacle, (wrap around the ear comfort cables , American Optical (805) 765-9711
- Replacing missing temple screws: Use locally procured screws.

Section D. Flyer's Jackets

D.1. Flyer's Jacket Introduction

The three types of flyer's jackets that are authorized for procurement and issue to all aircrew members and pilot, are as follows:

- CWU-36/P, Summer Nomex Jacket
- CWU-45/P, Winter Nomex Jacket
- G-1 Leather Jacket (Navy stock source not authorized)

Taking the annual climate and geographical flying area into consideration, each Commanding Officer will determine the appropriate jacket that shall be worn, regardless of the procurement source.

D.2. CWU-36/P, Summer Nomex Jacket Configuration

The summer nomex jacket (see figure 7-5) is constructed of a combination of Aramid (will not support combustion, but will begin to char at 700 °F to 800 °F) and nylon fabrics in the outer shell, and is lined with a Nomex barrier liner. The jacket is equipped with two external slash pockets covered with envelope storm flaps closed by hook and pile tape. The jacket has provisions for mounting a name tag with hook and pile tape and each have a combination pen/pencil pocket on the upper left arm.

Figure 7-5 CWU-36/P, Summer Nomex Jacket

D.2.a. CWU-36/P, Summer Nomex Jacket Application

The summer nomex jacket is designed to provide thermal protection in temperatures of 50 °F and above.

Continued next page

D.2.b. CWU-36/P, Summer Nomex Jacket Fitting

The summer nomex jacket is fitted to the aircrew member and normally corresponds to his/her regular jacket size. The jacket is used with standard Coast Guard personal equipment. The summer jacket is provided in the following sizes:

Size	Chest Measurement
Small	34-36
Medium	38-40
Large	42-44
Extra Large	46-48

D.2.c. CWU-36/P, Summer Nomex Jacket Modifications

Modifications to the summer nomex jacket are limited to addition of authorized patches as described in chapter 7, section B.5. Additional patches, such as EMT, Rescue Swimmer, and Aircraft type may be attached in a manner that maintains a military appearance.

D.2.d. CWU-36/P, Summer Nomex Jacket Calendar Inspection

Unit AST personnel shall perform a calendar inspection every 360 days. To perform the calendar inspection, proceed as follows:

Step	Action
1	Inspect fabric for condition (stains, fuel, oil, etc.), cuts, tears and abrasions.
2	Inspect stitching for holes and tears.
3	Inspect hook and pile fasteners for secure attachment and closure.
4	Inspect slide fasteners for damage, security, and ease of operation. Inspect thong pull-tabs for presence and security of attachment.

Continued next page

D.2.e. CWU-36/P, Summer Nomex Jacket Cleaning

Aircrew members are responsible for cleaning jackets issued to them. The jacket may be dry-cleaned. Use no starch. No ironing is required.

Step	Action
1	Wash in water up to 140 °F maximum.
2	Use of a commercial fabric softener in the rinse will remove body oils during the laundering process. The fabric softeners also serve to inhibit static generation.
3	After tumble-drying or during drip drying, the coverall should be hung on a wooden hanger.
4	The jacket may be dry-cleaned. Use no starch. No ironing is required. Dry cleaning or laundering will not compromise the flame-retardant properties, and no renewable flame-retardant treatment is required. **NOTE** Jackets, which are heavily soiled and/or stained with oil or grease, may be cleaned with solvents normally used in commercial dry cleaning establishments.

D.2.f. CWU-36/P, Summer Nomex Jacket Repairs

All summer nomex jacket repairs shall be performed by organizational level or above. Repairs for the jacket shall be limited to the following:

- Replacing the wrist cuffs
- Replacing the waistband
- Replacing the slide fastener
- Restitching partially open seams (Temperature resistant thread, MIL-T-83193, shall be used for restitching seams.)

Continued next page

D.2.g. CWU-36/P, Summer Nomex Jacket Wrist Cuffs Replacement

To replace a summer nomex jacket wrist cuff, proceed as follows:

Materials Required:
- Wrist Cuffs NSN 8315-01-028-3627
- Temperature resistant thread, MIL-T-83193

Step	Action
1	Open the jacket at the top collar from right shoulder to left shoulder seam.
2	Turn the jacket through the neck seam. Mark or thread-tack the joining seams of undersleeve to keep from twisting sleeve. Remove wrist cuffs at sleeve bottom.
3	Replace new wrist cuffs on outershell first.
4	Join the lining to the outershell, matching the marks. Pull through neck opening and topstitch/raisestitch ¼-inch from joining seam of cuff.
5	Topstitch collar to neck from shoulder to shoulder 1/16-inch from edge.

D.2.h. CWU-36/P, Summer Nomex Jacket Waistband Replacement

To replace a summer nomex jacket waistband, proceed as follows:

Materials Required:
- Waistband NSN 8315-01-028-4896
- Temperature resistant thread, MIL-T-83193

Step	Action
1	Open the jacket at the top collar from right shoulder to left shoulder seam.
2	Turn the jacket through the neck seam. Mark the center back to keep from twisting the waistband. Remove waistband at the bottom and extension facing pieces.
3	Join new waistband to extension facing pieces with a ½inch stitch. Turn the raisestitch ½inch from the edge.
4	Join waistband to bottom of jacket. Pull through neck opening and topstitch/raisestitch ¼-inch from joining seam of waistband.
5	Topstitch collar to neck from shoulder to shoulder 1/16-inch from edge.

Continued next page

D.2.i. CWU-36/P, Summer Nomex Jacket Slide Fastener Replacement

To replace a summer nomex jacket slide fastener, proceed as follows:

Materials Required:
- Temperature resistant thread, MIL-T-83193
- CWU-36/P Slide Fastener (pre-made) as required

Small	20 ½in.	NSN 5325-01-093-5237
Medium	21-in.	NSN 5325-01-097-8997
Large	21 ½in.	NSN 5325-01-097-8998
X-Large	22-in.	NSN 5325-01-093-5238

Step	Action
1	Remove jacket's slide fastener seam, and remove damaged slide fastener.
2	Insert pre-made slide fastener in the same manner as the old one.
3	Topstitch slide fastener in-place using the same stitch line as the original one.

D.3. CWU-45/P, Winter Nomex Jacket

The winter nomex jacket is constructed of a combination of Aramid (will not support combustion, but will begin to char at 700 °F to 800 °F) and nylon fabrics in the outer shell, and is lined with a Nomex inner quilted liner of insulating fill material. As with the summer jacket, it is designed with a bias cut back. The jacket is equipped with two external slash pockets covered with envelope storm flaps closed by hook and pile tape. The jacket has provisions for mounting a name tag with hook and pile tape and each has a combination pen/pencil pocket on the upper left arm.

D.3.a. CWU-45/P, Winter Nomex Jacket Application

The winter nomex jacket is designed to provide thermal anti-exposure protection at low temperatures.

D.3.b. CWU-45/P, Winter Nomex Jacket Fitting

The winter nomex jacket is fitted to the aircrew member and normally corresponds to his/her regular jacket size. The jacket is used with standard Coast Guard personal equipment. Sizes for the jacket are the same as the summer nomex jackets listed in chapter 7, section D.2.b.

Continued next page

D.3.c. CWU-45/P, Winter Nomex Jacket Modifications

Modifications to the winter nomex jacket are limited to addition of authorized patches as described in chapter 7, section B.5. Additional patches, such as EMT, Rescue Swimmer, and Aircraft type may be attached in a manner that maintains a military appearance.

D.3.d. CWU-45/P, Winter Nomex Jacket Calendar Inspection

Unit AST personnel shall perform a calendar inspection every 360 days. The winter jacket calendar inspection is the same as the summer jacket inspection listed in chapter 7, section D.2.d.

D.3.e. CWU-45/P, Winter Nomex Jacket Cleaning

Aircrew members are responsible for cleaning jackets issued to them. Cleaning the winter jacket is the same as the summer jacket cleaning procedures listed in chapter 7, section D.2.e.

D.3.f. CWU-45/P, Winter Nomex Jacket Repairs

All winter nomex jacket repairs shall be performed by organizational level or above. Repairs for the jacket shall be limited to the following:

- Replacing the cuffs (see chapter 7, section D.2.g)
- Replacing the waistband (see chapter 7, section D.2.h)
- Replacing the slide fastener (see chapter 7, section D.2.i)
- Restitching partially open seams (Temperature resistant thread, MIL-T-83193, shall be used for restitching seams.)

D.3.g. CWU-45/P, Winter Nomex Jacket Slide Fastener Replacement

Replace winter nomex jacket slide fasteners using the appropriate slide fastener listed below, and procedures provided in chapter 7, section D.2.i.

Materials Required:
- CWU-45/P Slide Fastener (pre-made) as required
- Temperature resistant thread, MIL-T-83193

Small	21-in.	NSN 5325-01-093-5239
Medium	21 ½in.	NSN 5325-01-036-2830
Large	22-in.	NSN 5325-01-036-0130
X-Large	22 ½in.	NSN 5325-01-036-0129

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D.4. G-1 Flight Jacket Configuration

The G-1 jacket is constructed of leather with a nylon cloth lining. The collar is mouton, and the cuffs and waistband are stretch knit cloth to provide a snug fit. The jacket is equipped with two external pockets and one inner pocket. Bellows, which extend from the shoulders to the waist, prevent the jacket body from riding up or binding with arm movement.

D.4.a. G-1 Flight Jacket Application

The G-1 jacket is designed to provide thermal protection in temperatures of 50 °F and above.

D.4.b. G-1 Flight Jacket Fitting

The G-1 flight jacket is fitted to the aircrew member and normally corresponds to his/her regular jacket size. The jacket is used with standard Coast Guard personal equipment. The G-1 flight jacket is provided in the following sizes:

Size	Chest Measurement
Small	34-36
Medium	38-40
Large	42-44
Extra Large	46-48
Extra Extra Large	50-52

D.4.c. G-1 Flight Jacket Modifications

Modifications to the G-1 flight jacket are limited to addition of authorized patches as described in chapter 7, section B.5. Additional patches, such as EMT, Rescue Swimmer, and Aircraft type may be attached in a manner that maintains a military appearance.

D.4.d. G-1 Flight Jacket Calendar Inspection

Unit AST personnel shall perform a calendar inspection every 360 days. The flight jacket calendar inspection is the same as the summer jacket inspection listed in chapter 7, section D.2.d.

Continued next page

D.4.e. G-1 Flight Jacket Leather Reconditioning

G-1 flight jacket leather reconditioning shall be performed by rubbing the leather with Saddle Soap or Mink Oil.

D.4.f. G-1 Flight Jacket Repairs

All G-1 flight jacket repairs shall be performed by organizational level or above. Repairs for the jacket shall be limited to the following:

- Replacing the wrist cuffs
- Replacing the waistband
- Restitching partially open seams

D.4.g. G-1 Flight Jacket Wrist Cuffs Replacement

To replace a G-1 flight jacket wrist cuff, proceed as follows:

Materials Required:
- Cuffs, Knit (Brown), NSN 8315-00-262-2578
- Thread, Nylon Type E NSN 8310-00-275-2790

Step	Action
1	Remove wrist cuffs at sleeve bottom.
2	Replace new wrist cuffs, ensuring the jacket inner lining and the outer leather shell are lined up (not twisted).
3	Using the previous stitching holes, topstitch the cuff.

D.4.h. G-1 Flight Jacket Waistband Replacement

To replace a G-1 flight jacket waistband, proceed as follows:

Materials Required:
- Waistband (obtain from Brill Brothers)
- Thread, Nylon Type E NSN 8310-00-275-2790

Continued next page

D.4.h. G-1 Flight Jacket Waistband Replacement (Continued)

The following is a continuation of the G-1 flight jacket waistband replacement procedures.

Step	Action
1	Mark the center back to keep from twisting the waistband. Remove waistband at the bottom and extension facing pieces.
2	Line the new waistband up with the old waistband. Mark the new waistband 1-inch shorter than the old waistband (this compensates for stretching of the old waistband).
3	Using the old stitching holes, join new waistband to extension facing pieces.
4	Using the old stitching holes, join waistband to bottom of jacket.

Section E. Flyer's Boots

E.1. Flyer's Boots Introduction

The following flyer's boots have been authorized for issue to aircrew members.

SUMMER

- TLS Model 800 (Belleville Shoe MFG. Co.)
- Steel Toe Hot Weather Boot-Black (Belleville Shoe MFG. Co.)
- Alpha Force ™ #2065 (Rocky ® Shoes and Boots Inc.)
- Navy Flyer's Boot (stock system)

WINTER

- Performance Duty Boot #6950 (Rocky ® Shoes and Boots Inc.)
- Women's Eliminator ® #6432 (Rocky ® Shoes and Boots Inc.)
- Eliminator ® # 6032 (Rocky ® Shoes and Boots Inc.)

NOTE

Requests for waivers from using these specified boots shall be sent to Commandant (G-OCA).

E.2. Flyer's Boots Application

All aircrew members, with the exception of the Rescue Swimmers, shall use the flyer's boot listed in Section E.1. in the performance of flight duties. Rescue Swimmers shall use the flyer's boots identified in Coast Guard Helicopter Rescue Swimmer Operations Manual, COMDTINST M3710.4 (series) only during the performance of rescue swimmer flight duties. The Rescue Swimmer shall maintain these boots IAW the applicable sections of this chapter.

E.3. Flyer's Boots Fitting

The flyer's boot is fitted to the aircrew member and normally corresponds to their regular shoe size.

Continued next page

E.4. Flyer's Boots Modifications

Normally the only modification authorized to the flyer's boots is the addition of the optional slide fastener inserts. Coast Guard or DOD Flight Surgeons may authorize modifications to counter physical problems.

E.5. Flyer's Boots Slide Fasteners Inserts

CAUTION

Inserts with metal slide fasteners are not authorized.

Inserts can be utilized with boots having fewer eyelets than the insert only if eyelets on the inserts are skipped periodically as they are laced in. Adjust laces with boots on and the slide fastener closed. A 30-inch lace (such as NIIN 00-205-2760) should be used to lace in the insert. Knot one end of the lace and start at the top eyelet, lace down the side, across and up the other side, knotting the end of the lace at the last (top) eyelet. Optional leather slide fastener inserts for laced boots are available from the stock system in two sizes. One has ten pairs of eyelets (NIIN 00-020-8447), and the other has nine pairs of eyelets (NIIN 00-020-8448).

E.6. Flyer's Boots Maintenance

The aircrew member is responsible for maintenance of the boots. Maintenance is limited to cleaning and polishing. Polish used on shoes for every day care is acceptable. There are no authorized repairs, as the sole and heel should outwear the upper boot. Broken or worn laces may be replaced with manufacture authorized laces or laces conforming to V-L-6 (NIIN 00-945-3969).

E.7. Navy Flyer's Boots Introduction

The impact-resistant Navy flyer's boot is designed to protect the wearer's foot against high impact forces. The boot is water-resistant. Optional slide fastener inserts are available.

E.7.a. Navy Flyer's Boots Configuration

The upper boot is constructed of high quality calfskin, is black in color, and is lined with soft, full grain glove leather. The boot is 8 inches high when fully laced and is available in sizes from 5 narrow to 15 extra wide. The traction tread soles and heels are made of non-slip, non-marking, jet fuel resistant rubber. The steel toe is constructed of cold rolled carbon steel to provide a safety margin because of greater compression resistance. A flap at the top of the boot is provided for lacing stowage.

Section F. Summer Flyer's Gloves

F.1. Summer Flyer's Gloves Introduction

The summer flyer's gloves are designated for use in warm to moderate temperature zones and provide protection in the event of aircraft fire.

F.2. Summer Flyer's Gloves Configuration

The summer flyer's gloves (see figure 7-6) are snug fitting and are designed to provide maximum dexterity and sense of touch so as not to interfere with the operation of the aircraft and use of survival equipment. The gloves are available in sizes 7 through 11. Since the fabric is stretchable, this range of sizes will accommodate any hand. The summer flyer's gloves are constructed of soft cabretta gray leather (palm and front portion of fingers) and a stretchable sage green, light-weight polyamide (aramide) fabric (entire back of hand). The cloth portion of the glove does not melt or drip and will not support combustion. The fabric will begin to char at 700 to 800 degrees F. The leather portion of the glove provides a non-slip surface (even when wet) for operations requiring manual dexterity.

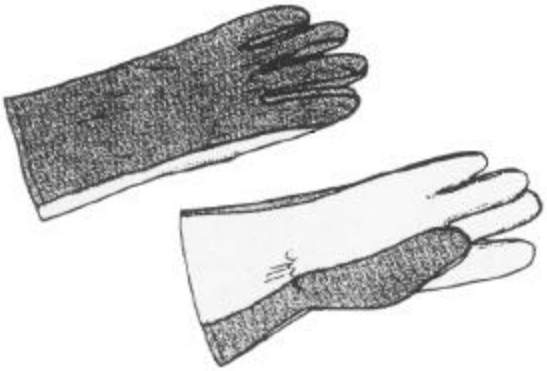

Figure 7-6 Summer Flyer's Gloves

F.3. Summer Flyer's Gloves Application

WARNING

The summer flyer's gloves are to be used only for in-flight. They are not to be used during routine maintenance (aircraft inspections or servicing).

The summer flyer's gloves are designated for use by all aircrew.

Continued next page

F.4. Summer Flyer's Glove Fitting

WARNING

Summer flyer's gloves shall not be rolled down toward the hand exposing the skin.

The summer flyer's glove is fitted to the aircrew member and normally corresponds to his/her shoe size. The glove must fit snugly.

F.5. Summer Flyer's Glove Modifications /Repairs

All modifications shall be performed by the lowest level possible and shall be restricted to the removal and restitching finger section(s) to accommodate a person with a finger amputation. Repairs are limited to restitching seams. Temperature resistant thread, MIL-T-83193. shall be used for restitching.

F.6. Summer Flyer's Glove Cleaning

The following are cleaning procedures for the summer flyer's gloves.

CAUTION

Do not wear gloves if they have been soaked in oil or fuel. The gloves shall be washed prior to wearing if they have been soaked in either of these liquids.

CAUTION

Do not use any bleaching compound.

Step	Action
1	Don the gloves.
2	Wash with soap and water as if washing hands.
3	When gloves are clean, rinse and remove from hands.
4	Squeeze, but do not wring gloves to remove excess water.
5	Place the gloves flat on a towel, and fold the towel to cover gloves making sure gloves do not contact each other.

Section G. Winter Flyer's Gloves

G.1. Winter Flyer's Gloves Introduction

The winter flyer's gloves (Model # MP11911) are designated for use in cold temperature zones and provide protection in the event of aircraft fire.

G.2. Winter Flyer's Gloves Configuration

The winter flyer's gloves are snug fitting and are designed to provide moderate dexterity and sense of touch so as not to interfere with the operation of the aircraft hoist and use of survival equipment. The gloves are available in sizes Small through XX-Large. Since the fabric is stretchable, this range of sizes will accommodate any hand. The winter flyer's gloves are constructed of soft cabretta black leather (palm and front portion of fingers) and a stretchable black, light-weight polyamide (aramide) fabric (entire back of hand). The cloth portion of the glove does not melt or drip and will not support combustion. The fabric will begin to char at 700 to 800 degrees F. The leather portion of the glove provides a non-slip surface (even when wet) for operations requiring manual dexterity. The Outlast® Temperature Regulation (combination of fiber, fabric and foam) is designed to absorb, store and release body heat evenly, and minimize hot and cold spots, even when wet or compressed.

G.3. Winter Flyer's Gloves Application

WARNING

The winter flyer's gloves are to be used only for in-flight. They are not to be used during routine maintenance (aircraft inspections or servicing).

The winter flyer's gloves are designated for use by non-pilot aircrew members only. Air station commanding officers are authorized to identify commercially procured winter gloves that assigned pilots may wear during non-flying operations such as pre/post flight operations or survival situations.

Continued next page

G.4. Winter Flyer's Glove Fitting

WARNING

Winter flyer's gloves shall not be rolled down toward the hand exposing the skin.

The winter flyer's glove must fit snugly, but not restrict hand movement.

G.5. Winter Flyer's Glove Modifications /Repairs

All modifications shall be performed by the lowest level possible and shall be restricted to the removal and restitching finger section(s) to accommodate a person with a finger amputation. Repairs are limited to restitching seams. Temperature resistant thread, MIL-T-83193. shall be used for restitching.

G.6. Winter Flyer's Glove Cleaning

The following are cleaning procedures for the winter flyer's gloves.

CAUTION

Do not wear gloves if they have been soaked in oil or fuel. The gloves shall be washed prior to wearing if they have been soaked in either of these liquids.

CAUTION

Do not use any bleaching compound.

Step	Action
1	Don the gloves.
2	Wash with soap and water as if washing hands.
3	When gloves are clean, rinse and remove from hands.
4	Squeeze, but do not wring gloves to remove excess water.
5	Place the gloves flat on a towel, and fold the towel to cover gloves making sure gloves do not contact each other.

Section H. SPH-5CG Flight Helmet

H.1. SPH-5CG Flight Helmet Introduction

The SPH-5CG is a lightweight helmet assembly providing head protection, noise reduction, and communication enhancement for helicopter personnel.

H.2. SPH-5CG Flight Helmet Configuration

The SPH-5CG helmet assembly (see figure 7-7) features a dual visor system with a mounting platform for night vision goggle (NVG) attachment. The helmet assembly consists of an energy absorbing Styrofoam liner and a preformed thermoplastic liner (TPL); a yoke style retention with adjustable chin and nape straps; and a communications assembly featuring a quick-disconnect, boom-mounted microphone and sound attenuating earcups.

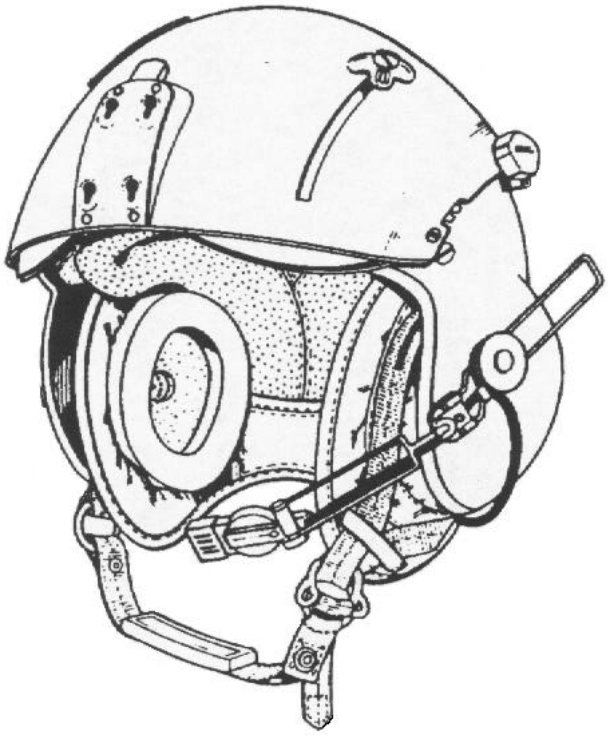

Figure 7-7 SPH-5CG Flight Helmet

H.3. SPH-5CG Flight Helmet Application

The helmet is available in three sizes; small, medium, and large. Refer to Enclosure 4 for fitting, maintenance, repairs, and inspection instructions.

Section I. Aircrew Anti-Exposure Coverall

I.1. Aircrew Anti-Exposure Coverall Introduction

The Aircrew Anti-Exposure Coverall (AAEC) is designed to be worn as an outer garment in the event of cold water immersion and to provide protection in the event of an aircraft fire and radiant heat.

I.2. Aircrew Anti-Exposure Coverall Configuration

The AAEC (see figure 7-8) are blue or orange in color and a one piece, lined garment fabricated from 79 % arimide, 20 % PBI (polybenzimidazole fiber) and 1 % stainless steel material. The AAEC fabric is high temperature, flame retardant, and prevents static electricity buildup. The insulating liner is a closed cell fire retardant 3/16-inch foam. The inner lining is made of a 3.0-ounce arimide fabric. Slide fasteners at the cuff to the knee are provided for donning while wearing flight boots. Two shin pockets and two front thigh pockets are provided for stowage of mittens and thermal headgear. Chest pockets are provided for stowage of personal items. A knife pocket located mid-thigh of the right leg is attached and will fit both types of survival knives.

Figure 7-8 AAEC

I.3. Aircrew Anti-Exposure Coverall Application

For all flights in Coast Guard aircraft during cold weather operations as directed by Coast Guard Air Operations Manual, COMDTINST M3710.1 (series). The AAEC has been authorized for use by all passengers and aircrew-members that have not been issued Aircrew Dry Coveralls (ADC).

I.4. Aircrew Anti-Exposure Coverall Calendar Inspection

Unit AST personnel shall perform a calendar inspection every 360 days. The AAEC calendar inspection is the same as the summer jacket inspection listed in chapter 7, section D.2.d.

Continued next page

I.5. Aircrew Anti-Exposure Coverall Fitting

WARNING

All slide fasteners shall be closed to their maximum length. Sleeves of the coveralls shall always be closed at the wrist, over glove cuff.

The AAEC are fitted to the aircrew member and normally correspond to his or her suit size. The coverall is used with standard Coast Guard personal survival equipment.

I.6 Aircrew Anti-Exposure Coverall Modifications

None authorized.

I.7. Aircrew Anti-Exposure Coverall Cleaning

CAUTION

Do not use bleach or chlorine products, stow wet, iron or hang in direct sunlight.

Step	Action
1	Hand wash AAEC with mild soap or detergent and water.
2	When AAEC is clean, rinse thoroughly.
3	Let hang dry on wooden hanger.
4	If immersed in salt water, rinse with fresh water and air dry by hanging.

Section J. Cold Weather Underwear

J.1. Cold Weather Underwear

The cold weather underwear CWU-43/P and CWU-44/P is designed to provide added thermal insulation.

J.2. Cold Weather Underwear Configuration

The aramide high temperature resistant cold weather underwear is broken down into two general areas: the drawers and the undershirt (see figure 7-9). For a brief description of each, proceed as follows:

- Drawers. The drawers are full-length with ankles of tight weave to fit snugly. They have a boxer style fly closure and an elastic waistband.

- Undershirt. The undershirt has full sleeves. The cuffs and neckband are of a tight weave to fit snugly.

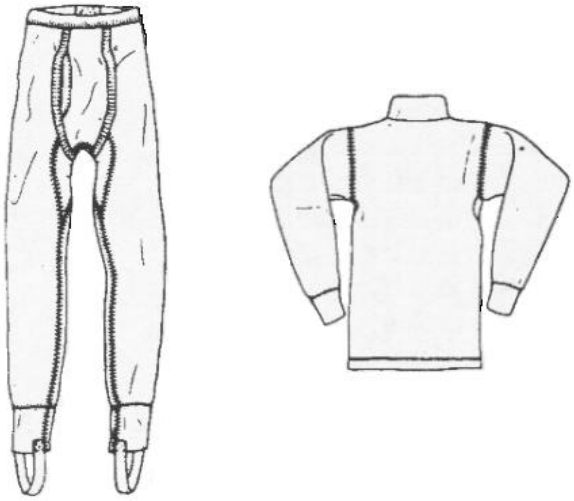

Figure 7-9 CWU-43/P Drawers & CWU-44/P Undershirt

J.3. Cold Weather Underwear Application

The cold weather underwear is designated for use by all aircrew operating in cold temperatures. The underwear may be used with the standard Coast Guard cold weather equipment.

J.4. Cold Weather Underwear Fitting

The cold weather undershirt and drawers are individually fitted to the aircrew. The proper size cold weather underwear normally corresponds to his/her regular underwear size.

Continued next page

J.5. Cold Weather Underwear Cleaning

It is recommended that new cold weather underwear be laundered prior to use in order to soften the fabric and eliminate any possible skin irritation that might occur due to original fabric harshness. The cold weather underwear requires no special handling and may be washed as frequently as needed. The cold weather underwear may be laundered at home or in a commercial type washer and dryer.

Step	Action
1	Wash in water up to 100 °F maximum.
2	Use of a commercial fabric softener in the rinse will remove body oils during the laundering process. The fabric softeners also serve to inhibit static generation.
3	**CAUTION** *Washing or drying cold weather underwear at hot temperatures will result in shrinkage.* After tumble-drying in a cool dryer to avoid shrinkage, fold garments neatly to avoid stretching.

Section K. Wool Socks

K.1. Wool Socks Introduction

The wool socks are to be worn with the boots during cold, wet operations in which added insulation to the feet is required.

K.2. Wool Socks Configuration

The socks are made of a wool/cotton blend with a ribbed, knitted top and plain knit leg and foot. The leg is 12 1/2 inches long. Socks shall be individually fitted to each aircrew member.

K.3. Wool Socks Application

Wool socks are intended for aircrew members operating in a cold environment where added thermal protection to the feet is necessary.

K.4. Wool Socks Cleaning

Wool socks cleaning procedures are the same as the cold weather underwear in chapter 7, section J.5.

Section L. Anti-Exposure Suit

L.1. Anti-Exposure Suit Introduction

The foam/neoprene survival suit may be utilized by crewmembers in survival situations. The suit affords protection from exposure to cold water, wind, and spray. The foam/neoprene fabric is a durable and elastic material possessing high flotation characteristics, approximately 35-lbs buoyancy.

L.2. Anti-Exposure Suit Configuration

The anti-exposure suit (see figure 7-10) is designed so that one size fits all adults. The thermal qualities of the fabric will keep a person warm whether they are wet or dry before donning the suit. The suit is configured with wrist seals in the arms to enable the user to maneuver their survival equipment. The anti-exposure suit has a glove pocket located on the right leg; the glove pocket contains mittens or gloves. The gloves will be secured with a 60-inch length of Type I cord.

CAUTION

Do not remove buoyancy device from survival suits.

Figure 7-10 Anti-Exposure Suit

Continued next page

L.3. Anti-Exposure Suit Application

For application, refer to the Coast Guard Air Operations Manual, COMDTINST M3710.1 (series), which lists climate conditions that shall warrant the carrying of the anti-exposure apparel on Coast Guard aircraft.

L.4. Anti-Exposure Suit Inspection Intervals

Inspection of the survival suit shall be in accordance with the applicable MSR MPC. The following are inspection intervals for the anti-exposure suit.

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The visual inspection will be performed at intervals not to exceed 180 days.

L.5. Anti-Exposure Suit Donning

The foam anti-exposure suit is utilized by crewmembers in a survival situation, and donning techniques in certain conditions may vary from the procedures in the following instructions.

CAUTION

When donning/wearing the anti-exposure suit, extreme care shall be taken to avoid sharp protruding objects which may snag or tear material of suit.

Step	Action
1	Open entrance slide fastener.
2	Don suit.
3	Close entrance slide fastener.

Continued next page

L.6. Anti-Exposure Suit Modification

The following procedures describe the application of the 2 x.2-inch pile tape to the anti-exposure suit hood.

Step	Action
1	Apply 4 coats of 2141 adhesive to the marked hood area and backside of pile tape, allowing first three coats to dry between application.
2	On final coat of cement, apply tape to hood when cement becomes tacky.

L.7. Anti-Exposure Suit Repairs

Maintenance shall be performed at the lowest level of maintenance possible. The following are repair procedures for the anti-exposure suit.

NOTE

Repaired items should be allowed at least 1 hour to set prior to using.

L.7.a. Anti-Exposure Suit Separated Seam Repairs

The following are procedures for repairing jagged edges of separated seams in the anti-exposure suit.

Step	Action
1	Trim jagged edges of separated seams with scissors until there is new rubber showing.
2	Apply four coats of cement along the entire surface of both edges of the material to be repaired, allowing each coat to dry between applications (usually 10 minutes).
3	When the last coat becomes tacky, line the ends up evenly and firmly press the edges together. Hold the edges together for 3-4 minutes.

Continued next page

L.7.b. Anti-Exposure Suit Rip or Tear Repair

The following are procedures for repairing rips or tears to the anti-exposure suit.

Step	Action
1	Trim edges of rip or tear.
2	Cement the edges together as described in chapter 7, section L.7.a.

L.7.c. Anti-Exposure Suit Hole Repair

The following are procedures for repairing holes to the anti-exposure suit.

Step	Action
1	Trim the edges of the area to convenient configurations; cut a replacement piece to conform to the size and shape of the prepared area.
2	Cement the edges together as described in chapter 7, section L.7.a.

L.7.d. Anti-Exposure Suit Corroded Slide Fastener Repair

The following are procedures for repairing an anti-exposure suits corroded slide fastener.

Step	Action
1	Scrub slide fastener with a toothbrush and fresh water.
2	Rub a bar of soap or paraffin (no oil or grease) over the edges of the slide fasteners to act as a lubricant and retard corrosion.

Continued next page

L.8. Anti-Exposure Suit Cleaning

When anti-exposure suits have been submerged or exposed to salt water spray, they shall be washed. The following are cleaning procedures for the anti-exposure suit.

CAUTION

In no case shall thinners, solvents, or any similar agents be used to clean suits exposed to paint, paint removers, acids, solvents, gasoline, or any substance containing acetones.

Step	Action
1	Wash suit under a shower with a mild soap.
2	**CAUTION** *Do not wring anti-exposure suit.* Hang suit on a wooden hanger in a cool, dry, well-ventilated area. Do not dry in direct sunlight. Dry the inside and outside of suit.

L.9. Anti-Exposure Suit Stowage

To stow the anti-exposure suit for long periods of time, complete the following procedures.

Step	Action
1	Ensure the suit is dry.
2	Close all slide fasteners (only on suits not placed in service).
3	**WARNING** Units shall stow suits placed into service with the entry slide fastener in the open position. Powder suit with a non-allergic hydrous silicate of magnesium powder (talc).
4	Store suit in a dry, well-ventilated locker, tacking with container handles exposed, or according to manufacturer's direction.

Section M. Aircrew Dry Coveralls

M.1. Aircrew Dry Coveralls (ADC) Introduction

The Aircrew Dry Coveralls (ADC) and components are intended for use by rotary-wing personnel on over-water flights where exposure to existing climatic and water conditions, as a result of abandonment of the aircraft, could be hazardous or fatal. The ADC assembly will afford protection from exposure to 32° F water for a period up to 14 hours.

M.2. ADC Configuration

The ADC (see figure 7-11) is designed to be custom fit to the aircrew members. Each rotary-wing aircrew member shall be issued one ADC. This suit will be configured using the applicable MSR MPC card. A complete ADC assembly consists of the following: Aircrew Dry Coverall, Undergarment suitable for local weather extremes; and Anti-Exposure Socks.

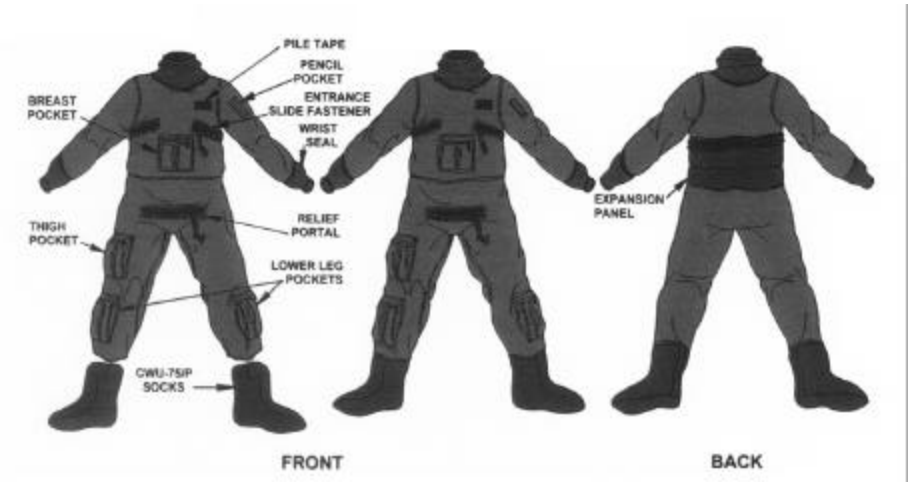

Figure 7-11 Aircrew Dry Coveralls

M.3. ADC Application

For application, refer to the Coast Guard Air Operations Manual, COMDTINST M3710.1 (series) which lists climate conditions that shall warrant the carrying of the anti-exposure apparel on Coast Guard aircraft.

Continued next page

M.4. ADC Inspection Intervals

Inspection of the ADC shall be in accordance with the applicable MSR MPC. The following are inspection intervals for the ADC.

- The acceptance inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.

  NOTE: *ADC's that accompany a transferring aircrew member do not require an acceptance inspection. However, these ADC's should receive a visual inspection.*

- The Preflight/Postflight inspection shall be performed on the ADC by the aircrew member to whom the ADC is issued prior to and after each flight.

- The visual inspection will be performed at intervals not to exceed 180 days.

- The screening inspection will be performed at intervals not to exceed 365 days.

M.5. ADC Don/Doffing Procedures

To don/doff the ADC, proceed as follows:

WARNING

Avoid eye contact with Talc Technical Powder, MIL-T-50036. Avoid inhalation. Wash thoroughly after handling.

CAUTION

To prevent damage to the ADC neck and wrist seals, the aircrew member shall remove all jewelry and apply Talc Technical Powder, MIL-T-50036, to their neck, hands, and wrists prior to donning the ADC.

Continued next page

M.5. ADC Don/Doffing Procedures (Continued)

The following is the continuation of the ADC donning/doffing procedures.

NOTE

The ADC shall not be worn in direct contact with the skin. The aircrew member shall always wear a Dry Suit Undergarment (DSUG) IAW Coast Guard Air Operations Manual, COMDTINST M3710.1 (series).

Step	Action
1	Don a DSUG suitable for the local climate.
2	Insert feet into the anti-exposure socks while seated.
3	Insert arms into the sleeves. If necessary, pull the wrist seal open with one hand while pushing the other hand through the seal.
4	Grasp the ADC by the zipper at the center of the back and pull it over your head.
5	Push your head through the neck seal. If necessary, pull the neck seal open with both hands while pushing your head through the seal.
6	Turn 1-inch of the neck seal under to increase comfort and enhance its ability to seal against the skin.
7	Close the entrance zipper as follows: **NOTE** If the zipper gets stuck, carefully and slowly move the slider back and forth until it is free. Do not use excessive force. You might need help to close the entrance zipper. a. Grasp the seal block with the right hand. b. Pull the zipper lanyard with the left hand as far as your range of motion allows. c. Change hand positions. Hold the seal block with the left hand, while pulling the lanyard with the right hand as far as your range of motion allows. d. Change hand positions again. Pull the lanyard tight against the seal block while holding the closed zipper for leverage.

Continued next page

M.5. ADC Don/Doffing Procedures (Continued)

The following is the continuation of the ADC donning/doffing procedures.

Step	Action
8	Close the relief port zipper. Make sure the slider is firmly seated against the seal block.
9	Vent any excess air out through the neck seal.
10	Don flight foots. Blouse any excess leg material over the outside of the boot.
11	To doff the ADC, carefully reverse the donning procedures.
12	Turn ADC inside out; hang on a wooden or plastic hanger.
13	Allow ADC to air-dry in a cool, dry, well-ventilated area.

M.6. ADC Preflight Inspection

To perform a preflight inspection, proceed as follows:

CAUTION

To aid in preventing corrosion and protect the surrounding material from catching during opening and closing, apply a commercial type paraffin wax or lubricant stick to chain portion of zipper while fastener is fully closed. Do not apply wax or lubricant to chain teeth when fastener is open since wax or lubricant will gum up teeth lines.

Step	Action
1	Inspect water and pressure-proof entry and relief portal slide fasteners for proper functioning, with particular attention to sealing of the pull into the seal block when fastener is closed completely.
2	Inspect suit for broken stitching, seam separation, loose seam tapes, cuts, tears, abrasions, or deterioration of the ADC fabric.

Continued next page

M.6. ADC Preflight Inspection (Continued)

The following is the continuation of the ADC preflight inspection procedures.

Step	Action
3	Inspect neck and wrist seals for proper bonding to the ADC and that no damage exists. **NOTE** Seals should be checked for looseness, which could permit passage of water inside the ADC.
4	Inspect socks for proper attachment to the ADC and for any leak points.
5	If any discrepancies are noted, return ADC to survival shop for further inspection.

M.7. ADC Postflight Inspection

To perform a postflight inspection, proceed as follows:

Step	Action
1	Perform all inspection steps provided in chapter 7, section M.6.
2	Turn ADC inside out; hang on a wooden or plastic hanger.
3	Allow ADC to air-dry in a cool, dry, well-ventilated area.

M.8. ADC Modifications

None authorized.

Continued next page

M.9. ADC Repairs

Switlik Parachute Company shall perform all repairs to the ADC. The following are the ADC repair policy guidelines:

- Any suit returned for repairs shall have the neck and wrist seals and both anti-exposure socks replaced regardless of their condition.
- Tears up to 6 inches in linear length in the ADC fabric may be repaired.
- Any ADC with tears over 6 inches in linear length or that have damaged waterproof slide-fasteners shall be scrapped IAW established guidelines.

M.10. ADC Spot Cleaning

To spot clean the ADC, proceed as follows:

CAUTION

Do not use bleach or similar laundry additives. Do not dry clean the ADC.

Step	Action
1	Clean grease and oil spots by rubbing a small amount of Simple Green degreaser onto the spot using a soft clean cotton cloth.
2	Thoroughly rinse the spot to remove the degreaser.

Continued next page

M.11. ADC Washing To wash the ADC, proceed as follows:

CAUTION

Put the ADC into a net laundry bag prior to washing to reduce wear. Wash the ADC in cold water only.

Step	Action
1	Hand wash, or use a clothes washer on the delicate cycle. Follow the detergent manufacturer's recommendations for the amount of detergent to use.
2	Rinse the ADC three times. Use cold, clean, fresh water for each rinse.
3	**CAUTION** *If the ADC is dried in a clothes dryer, use the delicate fabric and lowest heat settings. The drying cycle shall not exceed 20 minutes.* Hang the ADC by the shoulders on a wooden or plastic hanger in a well-ventilated area. If air-drying, leave the entrance and relief zippers open. If tumble drying, close the zippers and use the delicate fabric and lowest settings.
4	When the outside of the ADC is dry, turn it inside out to finish drying.

Continued next page

M.12. ADC Storage To store the ADC for an extended period of time, proceed as follows:

CAUTION

The ADC shall not be stored in an atmosphere containing high concentrations of ozone. The ADC should be stored in a cool, dark place as prolonged exposure to the sun's ultra-violet rays is not recommended. Care should also be given to keep the ADC away from acids, gasoline, oil, and other petroleum products.

Step	Action
1	Ensure that the ADC is clean and completely dry.
2	Close slide fasteners on ADC within 4 inches of end seal blocks.
3	**NOTE** During periods of temporary storage (such as between flights), the ADC should be on a wooden or plastic hanger to minimize damage to fabric from repeated folding. Fold ADC IAW Figure 7-12.
4	Place ADC in a plastic bag and clearly label with member's name and unit.
5	Loosely pack bagged ADC's in a locker or other appropriate storage container.
6	The ADC shall be stored in a controlled temperature environment (68 °F – 75 °F) away from areas where high temperatures and/or humidity may occur.

Continued next page

M.12. ADC Storage (Continued)

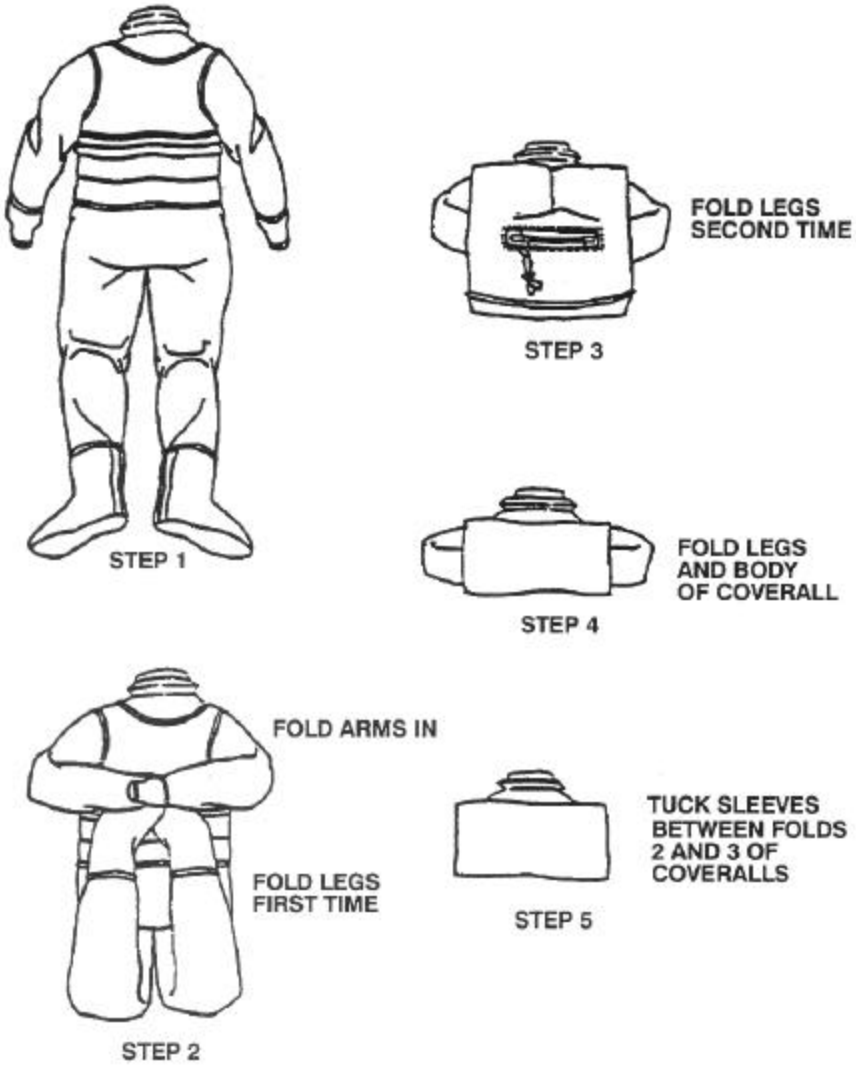

Figure 7-12 ADC Folding

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Section N. Rescue Swimmer's Wet Suit Ensemble

N.1. R/S Wet Suit Ensemble Introduction

The R/S wet suit ensemble (Henderson Aquatics' Orange Maxx Wet Suit Ensemble P/N CG SET) is an exposure protective assembly for continuous wear and will protect the rescue swimmer from exposure to moderate water temperatures, wind, and spray experienced during emergency rescue actions at sea.

N.2. R/S Wet Suit Ensemble Configuration

The rescue swimmer's wet suit ensemble consists of a 5/3-MM wet suit, a one piece 3/2-MM shorty wet suit, hood, gloves, and boots. Additionally, a 3/2-MM jumpsuit (P/N 1800) is available separate from the ensemble.

N.3. R/S Wet Suit Ensemble Inspection Intervals

Inspection of the R/S wet suit ensemble shall be in accordance with the applicable section in this manual. The following are inspection intervals for the R/S wet suit ensemble.

- The Acceptance Inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The Duty-Day Inspection shall be performed prior to accepting the R/S duty responsibility.
- A Visual Inspection will be performed at intervals not to exceed 90 days.

N.3.a. R/S Wet Suit Acceptance and Duty-Day Inspections

The following are procedures for an Acceptance and Duty-Day Inspection.

Step	Action
1	Conduct an inventory of the ensemble for all items.
2	If performing an Acceptance Inspection, don all of the ensemble items to ensure proper fit and freedom of movement.
3	Inspect suits, hood, gloves, and booties for cuts, tears, holes, and security of stitched, glued, and taped seams.

Continued next page

N.3.a. R/S Wet Suit Acceptance and Duty-Day Inspections (Continued)

The following is the continuation of the Acceptance and Duty-Day Inspection procedures.

Step	Action
4	Inspect slide fasteners for security of stitching and ease of operation. Clean slide fastener with a brush and lubricate with paraffin wax Grade A or zipper lube.
5	Inspect abrasion patches on buttocks and knees for wear and security.
6	Inspect reflective tape on hood and suits for wear and security.
7	Inspect pile tape on hood.
8	• Acceptance Inspection: Using an indelible marker, label each ensemble item with the users initials and last name. • Duty-Day Inspection: Inspect identifying markings for legibility.
9	• Acceptance Inspection: If discrepancies are found, return the effected ensemble item(s) to the manufacturer for repair. (For tracking potential manufacturing problems, notify the R/S Stan Team of problems with an ensemble coming from the manufacturer.) • Duty-Day Inspection: Repair any discrepancies found IAW the applicable section(s) of this chapter.

N.3.b. R/S Wet Suit Visual Inspection

The following are procedures for Visual Inspection.

Step	Action
1	Conduct an inventory of the ensemble for all items.
2	Inspect suits, hood, gloves, and booties for cuts, tears, holes, and security of stitched, glued, and taped seams.

Continued next page

N.3.b. R/S Wet Suit Visual Inspection (Continued)

The following is the continuation of the Visual Inspection procedures.

Step	Action
3	Inspect identifying markings for legibility.
4	Inspect slide fasteners for security of stitching and ease of operation. Clean slide fastener with a brush and lubricate with paraffin wax Grade A or zipper lube.
5	Inspect abrasion patches on buttocks and knees for wear and security.
6	Inspect reflective tape on hood and suits for wear and security.
7	Inspect pile tape on hood.
8	Repair any discrepancies found IAW the applicable section(s) of this chapter.
9	**WARNING** Avoid eye contact with liquid detergent (Joy). Avoid ingestion. Shower wash wet suit ensembles exterior and interior with mild soap (Joy) and warm water. **CAUTION** *Do not wring wet suit or ensemble item(s).*
10	Hang ensemble on wooden hangers in a cool, dry, well-ventilated area, out of direct sunlight.

N.4. R/S Wet Suit Ensemble Modifications

None authorized.

Continued next page

N.5. R/S Wet Suit Ensemble Repairs

Maintenance shall be performed at the lowest level of maintenance possible. The following are repair procedures for the wet suit ensemble.

NOTE

Commercial assistance should be obtained for repairs beyond the capabilities of the unit.

N.5.a. R/S Wet Suit Ensemble Loose Retro-Reflective Tape

The following are procedures for re-gluing loose retro-reflective tape on the wet suit ensemble.

Step	Action
1	Clean and dry affected area.
2	Apply four coats of 2141 adhesive to the exposed section of wet suit and retro-reflective tape. Allow adhesive to dry (20 minutes) between coats.
3	With the fourth coat of adhesive tacky, position tape and apply pressure to the tape and wet suit.
4	Allow suit to dry 12 hours prior to use.

Continued next page

N.5.b. R/S Wet Suit Ensemble Missing Retro-Reflective Tape

The following are procedures for replacing missing retro-reflective tape on the wet suit ensemble.

Step	Action
1	Clean and dry applicable area.
2	Cut a 2 by 4-inch piece of retro-reflective tape.
3	Cut a 4 by 6-inch piece of iron-on neoprene material.
4	Using 4 coats of 2141 adhesive, center and attach the retro-reflective tape to the fabric side of the iron-on neoprene material. Allow adhesive to dry (20 minutes) between coats.
5	Position retro-reflective tape on wet suit and cover area with a damp cloth.
6	With a preheated household iron set on permanent press (@ 340 with no steam), press neoprene material down firmly for 10 seconds.
7	Lift and rotate iron. Press down firmly again for 15 more seconds.
8	Allow area to cool for a few minutes. Check security of material.

N.5.c. R/S Wet Suit Ensemble Tear Repairs

The following are procedures for repairing tears to the wet suit ensemble.

Step	Action
1	Clean and dry applicable area.
2	Trim jagged edges of tear until new material shows.
3	Using 2141 (or similar neoprene adhesive) apply 4 coats of adhesive along edges of material to be repaired. Allow adhesive to dry (20 minutes) between coats.

Continued next page

N.5.c. R/S Wet Suit Ensemble Tear Repairs (Continued)

The following is a continuation of procedures for repairing tears to the wet suit ensemble.

Step	Action
4	When the last coat of adhesive becomes tacky, align the edges and apply firm and even pressure. Hold edges together for 3 to 4 minutes.
5	Allow 12 hours for the adhesive to cure.
6	Using a similar color iron-on neoprene material, cut two patches 2 inches larger than the tear.
7	Position one patch on the inside of the wet suit and cover area with a damp cloth.
8	With a preheated household iron set on permanent press (@ 340 with no steam), press neoprene material down firmly for 10 seconds.
9	Lift and rotate iron. Press down firmly again for 15 more seconds.
10	Allow area to cool for a few minutes. Check security of material.
11	Repeat steps 7 through 10 with the outside patch.

N.5.d. R/S Wet Suit Ensemble Hole Repairs

The following are procedures for repairing holes in the wet suit ensemble.

Step	Action
1	Holes larger than 2 inches in diameter shall be returned to the manufacturer for repair.
2	Using wet suit material of a similar color, cut a replacement piece conforming to the size and shape of the hole.
3	Ensure area to be repaired is clean and dry.
4	Glue the replacement piece into place using the gluing procedures in chapter 7, section N.5.c. steps 3 through 11.

Continued next page

N.5.e. R/S Wet Suit Ensemble Repair of Missing Stitches

The following are procedures for repairing missing stitches on the wet suit ensemble.

Step	Action
1	Repairing missing stitches is limited to 301 Lock stitching only. Use FF thread at 5 stitches per inch. Backstitch ½inch.
2	The manufacturer shall repair any other type of stitching.

N.5.f. R/S Wet Suit Ensemble Slide Fastener Repair

Wet suit ensembles requiring slide fastener repairs shall be returned to the manufacturer for repair.

N.6. R/S Wet Suit Ensemble Storage

Wet suit ensembles requiring storage shall be prepared and stored using the following procedures.

Ensemble Status	Inspection Required	Storage Procedures
New from Manufacturer	Acceptance Inspection	In its original shipping container, store in a cool, dry, well-ventilated area, out of direct sunlight.
Used	Visual Inspection	In its original shipping container or a canvas bag, store in a cool, dry, well-ventilated area, out of direct sunlight.

Section O. Rescue Swimmer's Dry Suit

O.1. R/S Dry Suit Introduction

The dry suit is a rapid self-donning designed Trilaminate anti-exposure garment to be worn by helicopter rescue swimmers during emergency rescue actions in extremely cold water. The dry suit affords protection to the swimmer from exposure to cold water, wind, and spray and is compatible with other rescue swimmer equipment.

O.2. R/S Dry Suit Configuration

The rescue swimmer's dry suit consists of a one-piece custom fitted Trilaminate dry suit with a compatible dry hood, wet hood, and gloves. The dry suit's exterior is International Orange overlays placed in high wear areas. An automatic cuff dump valve is provided on the dry suit's left sleeve to rapidly vent air from the suit when entering the water. The suit and hood have white retro-reflective tape attached to provide visibility during night rescue operations. Authorized dry suit underwear shall be worn underneath suit to provide increased warmth.

O.3. R/S Dry Suit Inspection Intervals

Inspection of the R/S dry suit shall be in accordance with the applicable sections in this manual. The following are inspection intervals for the R/S dry suit.

- The Acceptance Inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The Duty-Day Inspection shall be performed prior to accepting the R/S duty responsibility.
- A Visual Inspection will be performed at intervals not to exceed 90 days.

O.3.a. R/S Dry Suit Acceptance Inspection

The following are procedures for an Acceptance Inspection.

Step	Action
1	Don the dry suit to ensure proper fit and freedom of movement.

Continued next page

O.3.a. R/S Dry Suit Acceptance Inspection (Continued)

The following is the continuation of the Acceptance Inspection procedures.

Step	Action
2	Modify the Dry suit as follows: a. With the dry suit on, mark the correct fit of the neck and wrist seals, using the inner rings as reference points. b. Doff the dry suit. c. Cut neck and wrist seals at marks. d. Don dry suit and check seals. If seals are too tight, repeat steps 2.a through 2.d. **NOTE** *A proper seal is essential for the dry suit to work. If too loose, water will enter the suit, if too tight, circulation will be restricted.*
3	Inspect suits, hood, gloves, and booties for cuts, tears, holes, and security of stitched, glued, and taped seams.
4	Inspect slide fasteners for security of stitching and ease of operation. Clean slide fastener with a brush and lubricate with paraffin wax Grade A or zipper lube.
5	Inspect abrasion patches on buttocks and knees for wear and security.
6	Inspect boots, neck seal, and wrist seals for condition and security.
7	Inspect reflective tape on suit and hood for condition and security.
8	Inspect hook and pile tape on suit and hood for condition and security.
9	Inspect exhaust valve for condition, operation and security.
10	Using an indelible marker, label each ensemble item with the user's initials and last name.
11	If discrepancies are found, return the suit to the manufacturer for repair. (For tracking potential manufacturing problems, notify the R/S Stan Team of problems with a suit coming from the manufacturer.)

Continued next page

O.3.b. R/S Dry Suit Duty-Day Inspection

The following are procedures for a Duty-Day Inspection.

Step	Action
1	Inspect suits, hood, gloves, and booties for cuts, tears, holes, and security of stitched, glued, and taped seams.
2	Inspect slide fasteners for security of stitching and ease of operation. Clean slide fastener with a brush and lubricate with paraffin wax Grade A or zipper lube.
3	Inspect abrasion patches on buttocks and knees for wear and security.
4	Inspect boots, neck seal, and wrist seals for condition and security.
5	Inspect reflective tape on suit and hood for condition and security.
6	Inspect hook and pile tape on suit and hood for condition and security.
7	Inspect exhaust valve for condition, operation and security.
8	Inspect outer markings for legibility.
9	Repair any discrepancies found IAW the applicable section(s) of this chapter.

O.3.c. R/S Dry Suit Visual Inspection

The following are procedures for a Visual Inspection.

Step	Action
1	Inspect suits, hood, gloves, and booties for cuts, tears, holes, and security of stitched, glued, and taped seams.
2	Inspect slide fasteners for security of stitching and ease of operation. Clean slide fastener with a brush and lubricate with paraffin wax Grade A or zipper lube.
3	Inspect abrasion patches on buttocks and knees for wear and security.

Continued next page

O.3.c. R/S Dry Suit Visual Inspection (Continued)

The following is the continuation of the Visual Inspection procedures.

Step	Action
4	Inspect boots, neck seal, and wrist seals for condition and security.
5	Inspect reflective tape on suit and hood for condition and security.
6	Inspect hook and pile tape on suit and hood for condition and security.
7	Inspect exhaust valve for condition, operation and security.
8	Inspect outer markings for legibility.
9	Repair any discrepancies found IAW the applicable section(s) of this chapter.
10	**WARNING** Avoid eye contact with liquid detergent (Joy). Avoid ingestion. Shower wash wet suit ensembles exterior and interior with mild soap (Joy) and warm water. **CAUTION** *Do not wring dry suit.*
11	Hang dry suit inside out on wooden hangers in a cool, dry, well-ventilated area, out of direct sunlight.

O.4. R/S Dry Suit Modifications

Modifications to the R/S dry suit are limited to fitting the neck and wrist seals. These procedures can be found in chapter 7, section O.3.a.

Continued next page

O.5. R/S Dry Suit Repairs

Only the following repairs may be performed at the unit level. Suits in need of other repairs shall be returned to the manufacturer for repair. The following are repair procedures for the dry suit.

O.5.a. R/S Dry Suit Loose Retro-Reflective Tape

The following are procedures for re-gluing loose retro-reflective tape on the dry suit.

Step	Action
1	Clean and dry affected area.
2	Apply four coats of 2141 adhesive to the exposed section of dry suit and retro-reflective tape. Allow adhesive to dry (20 minutes) between coats.
3	With the fourth coat of adhesive tacky, position tape and apply pressure to the tape and dry suit.
4	Allow suit to dry 12 hours prior to use.

O.5.b. R/S Dry Suit Missing Retro-Reflective Tape

The following are procedures for replacing missing retro-reflective tape on the dry suit ensemble.

Step	Action
1	Clean and dry applicable area.
2	Using 1-inch or 2-inch retro-reflective tape as required, cut a replacement piece to required length.
3	Apply four coats of 2141 adhesive to the exposed section of dry suit and retro-reflective tape. Allow adhesive to dry (20 minutes) between coats.
4	With the fourth coat of adhesive tacky, position tape and apply pressure to the tape and dry suit.
5	Allow suit to dry 12 hours prior to use.

Continued next page

O.5.c. R/S Dry Suit Corrosion of Slide Fastener

The following are procedures for cleaning corrosion from the dry suit slide fastener.

Step	Action
1	Scrub slide fastener with a toothbrush and fresh water.
2	Rub paraffin wax or Zipper Lube over edges of slide fastener to act as a lubricant and retard corrosion.

O.6. R/S Dry Suit Cleaning

The dry suit shall be cleaned IAW chapter 7, section O.3.c. steps 10 through 11.

CAUTION

In no case shall thinner or any similar agent be used for cleaning suits that have been exposed to paint, paint removers, acids, solvents, gasoline, or any substance containing acetone. Suit shall be shower washed only. When suits have been submerged or exposed to salt water spray, suit shall be shower washed.

O.7. R/S Dry Suit Storage

A dry suit requiring storage shall be prepared and stored using the following procedures.

Suit Status	Inspection Required	Storage Procedures
New from Manufacture	Acceptance Inspection	In its original shipping container, store in a cool, dry, well-ventilated area, out of direct sunlight.
Used	Visual Inspection	In its original shipping container or a canvas bag, store in a cool, dry, well-ventilated area, out of direct sunlight.

Section P. Rescue Swimmer Mask

P.1. R/S Mask Introduction

The R/S mask is a Seavisions' 1202C series swimmer mask P/N PF1202C. The mask is a silicone, split vision window design, with unbreakable UV protected lenses, and chemical light bar already attached. Prescription lenses are also available (P/N SV-1202C).

P.2. R/S Mask Inspection Intervals

Inspection of the R/S mask shall be in accordance with the applicable section in this manual. The following are inspection intervals for the R/S mask.

- The Acceptance Inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The Duty-Day Inspection shall be performed prior to accepting the R/S duty responsibility.

P.2.a. R/S Mask Acceptance and Duty-Day Inspections

The following are procedures for an Acceptance and Duty-Day Inspection.

Step	Action
1	Print name on strap using white paint pen.
2	Inspect chemical light attachment for security and condition of adel clamp.
3	**NOTE** Only use silicone keepers with mask. Inspect silicone parts of the mask for cracks, tears, and deterioration.
4	Inspect condition and security of mask strap.
5	Wash mask with a mild soap and warm water. Hang dry in cool, well-ventilated area; do not expose to direct heat or sunlight.

Continued next page

P.2.a. R/S Mask Acceptance and Duty-Day Inspections (Continued)

The following is the continuation of the Acceptance and Duty-Day Inspection procedures.

Step	Action
6	**WARNING** Keep glass cleaner PG-406, away from all sources of ignition. Avoid eye or skin contact. Avoid inhalation and ingestion. Wash thoroughly after handling. Inspect glass for scratches, cracks, and security. Clean glass with standard cleaner (P/N PG-406) and soft lint-free cloth.

P.3. R/S Mask Modifications

None authorized.

P.4. R/S Mask Repairs

Repairs to the R/S mask are limited to the replacement of the mask-retaining strap and chemical light clamp loop (Adel Clamp) NSN 5340-00-964-2557.

P.5. R/S Mask Storage

Store the R/S mask in a dry, well-ventilated area; do not expose to direct heat or sunlight.

Section Q. Rescue Swimmer Snorkel

Q.1. R/S Snorkel Introduction

The R/S snorkel is made of a rigid silicone upper tube with a flexible hose and mouthpiece attached. The top of the rigid tube is taped with "GLO-TOP" high visibility tape and ruby red reflective tape. A silicone snorkel keeper attaches snorkel to R/S mask.

Q.2. R/S Snorkel Inspection Intervals

Inspection of the R/S snorkel shall be in accordance with the applicable section in this manual. The following are inspection intervals for the R/S snorkel.

- The Acceptance Inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The Duty-Day Inspection shall be performed prior to accepting the R/S duty responsibility.

Q.2.a. R/S Snorkel Acceptance and Duty-Day Inspections

The following are procedures for an Acceptance and Duty-Day Inspection.

Step	Action
1	If performing an acceptance, cut one piece or 1" x 4" ruby red Retro-Reflective tape. Place the reflective tape along and around the uppermost edge.
2	Inspect reflective tape for security and condition. Replace tape that is cracked, torn, or missing, IAW step 1, as required.
3	**NOTE** Only use silicone keepers with mask. Inspect snorkel keeper for cracks, tears, deterioration, and security to mask strap.
4	Inspect flexible hose and mouthpiece for holes, tears, deterioration and cleanliness.
5	Wash snorkel with a mild soap and warm water. Hang dry in cool, well-ventilated area; do not expose to direct heat or sunlight.

Continued next page

Q.3. R/S Snorkel Modifications

Modifications to the R/S snorkel are limited to the addition or replacement of the ruby red reflective tape IAW chapter 7, section Q.2.a. step 1.

Q.4. R/S Snorkel Repairs

Repairs to the R/S snorkel are limited to replacement of the ruby red reflective tape and silicone snorkel keeper.

Q.5 R/S Snorkel Storage

Store the R/S snorkel in a dry, well-ventilated area; do not expose to direct heat or sunlight.

Section R. Rescue Swimmer Swim Fins

R.1. R/S Swim Fins Introduction

The R/S swim fins are black rubber pliable vented fins with adjustable straps and buckles. The fins come from U.S. Divers in two sizes: Rocket (MEDIUM) P/N 6211-10 and Super Rocket (LARGE) P/N 6216-10.

R.2. R/S Swim Fins Inspection Intervals

Inspection of the R/S fins shall be in accordance with the applicable section in this manual. The following are inspection intervals for the R/S fins.

- The Acceptance Inspection will be performed upon original issue, when received from supply, or accepted from another unit for permanent custody.
- The Duty-Day Inspection shall be performed prior to accepting the R/S duty responsibility.

R.2.a. R/S Swim Fins Acceptance and Duty-Day Inspections

The following are procedures for an Acceptance and Duty-Day Inspection.

WARNING

Using wire or tie-wraps to secure fin straps may cause injury to swimmer or survivor and shall not be used.

Step	Action
1	Print name on strap using white paint pen.
2	Inspect buckles for proper function, strap for cracks, tears, deterioration, and security.
3	Inspect fins and fin pockets for cuts, tears, and chafing.
4	Wash fins with a mild soap and warm water. Hang dry in cool, well-ventilated area; do not expose to direct heat or sunlight.

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R.3. R/S Swim Fins Modifications

To prevent entanglement of fins strap ends with lines and debris in water, attach straps so ends will be toward inside of fin pocket or secure strap ends with waterproof tape only.

R.4. R/S Swim Fins Repair

Repairs to the swim fins are limited to the replacement of the fin-retaining strap.

R.5. R/S Swim Fins Storage

CAUTION

Do not store the rubber swim fins in contact with the silicone mask or snorkel.

Store the R/S swim fins in a dry, well-ventilated area; do not expose to direct heat or sunlight.

Enclosure (1) CG-538 Flight Gear Issue Form

USCG Form CG-538 Aviation Flight Gear Issue	NAME OF MEMBER (Last, First, MI)	SOCIAL SECURITY NO.

DIVISION	DUTY PHONE	GRADE/RATE	UNIT

AUTHORITY: 10 USC 9832 and EO 9397
PRINCIPAL PURPOSE(S): To account for personal clothing and equipment issued you for personal retention while on active duty.
ROUTINE USES: To account for personal clothing and equipment issued you. Also used to conduct inventory and validation of personal retention items, and to insure you have the proper personal clothing and equipment to perform your duties.
DISCLOSURE IS MANDATORY: Government property will not be issued to you if form is not completed. SSN is used for positive identification.

	ITEM	SIZE	QTY	ISSUE DATE	RECEIVED BY
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
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19					

PAGE _____ OF _____ PAGES

Enclosure (1) CG-538 Flight Gear Issue Form

RECORD OF EQUIPMENT TURN-IN

	ITEM	SIZE	QTY	ISSUE DATE	RECEIVED BY (AST SHOP REP.)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
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13					
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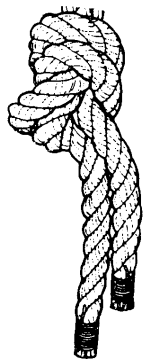
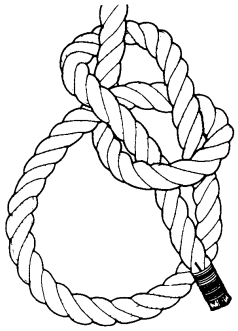
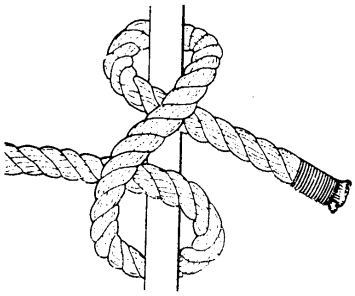
15					

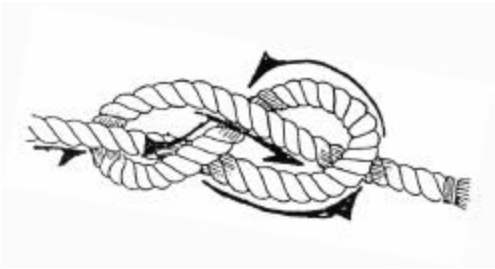
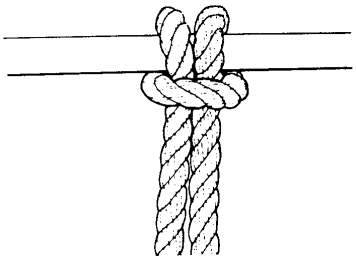
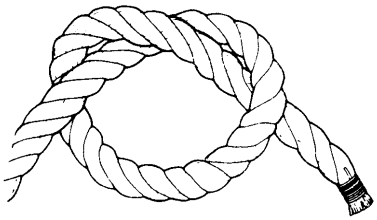
REMARKS:

Remarks for lost or stolen equipment are required and shall be brought to the attention of the unit Engineering Officer.

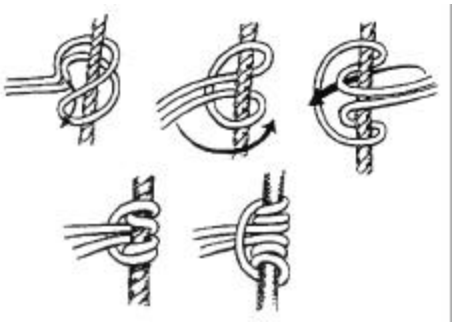
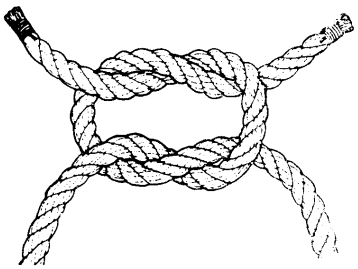
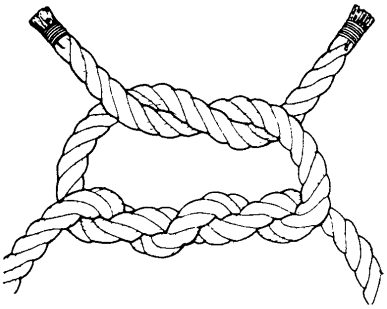
Enclosure (2) Knots

Knot	Example	Definition
Knot, Binder	 KNOT, BINDER	The simplest method of joining two threads or lines. The two ends are placed side by side and a simple, over hand knot is then tied in both lines simultaneously. It will not slip when drawn tightly. Also called a thumb knot.
Knot, Bowline	 KNOT, BOWLINE	A knot formed by making a small overhand loop a desired distance from the end of the line. The end of the cord or line is passed through the loop from the underside of the main part of the line and back through the small loop. When this knot is drawn tight, it will not slip but still can be easily untied.
Knot, Clove Hitch	 KNOT, CLOVE-HITCH	A knot formed by making one turn around a post, bring the end across the line, continuing around the post a second time and passing the end under the second loop.

Continued next page

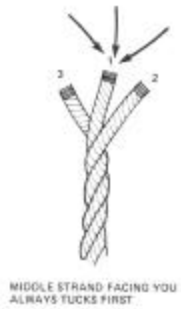
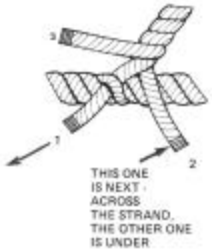
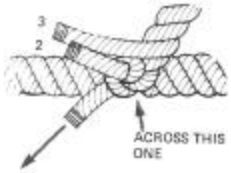
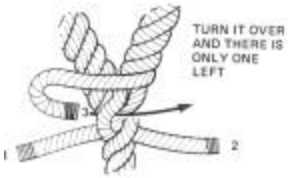
Knot	Example	Definition
Knot Figure 8	 FIGURE 8	A knot formed by making a bight near the end of a line without twisting it in anyway. Holding the line securely with the left hand, take the tip of the bight in the right hand and make two half twists turning the wrist outward. Then pass the end through the eye of the bight.
Knot, Fisherman's	KNOT, FISHERMAN'S	A knot formed by laying the two working parts alongside and parallel to one another. Tie an identical overhand knot around each standing part with the other working end. Pull them together.
Knot, Lark's Head	 KNOT, LARK'S HEAD	A knot formed around an attachment ring or bar by passing the free ends of the cord or line around the bar or bight in the line.
Knot, Overhand	 KNOT, OVERHAND	A simple knot tied in the end of a cord or line by forming a loop and passing the end over and down through the loop.

Continued next page

Knot	Example	Definition
Knot, Pursik	 KNOT, PURSIK	A knot formed by forming a loop with one line then wrapping the loop around the main line. Wrap the loop around the line a second time, and then pull to tighten.
Knot, Square	 KNOT, SQUARE	A knot formed by passing the end of the cord or line in the left hand over and under the end in the right hand and then reversing the process by passing the end in the right hand over and under the one in the left hand.
Knot, Surgeon's	 KNOT, SURGEON'S	The surgeon's knot is similar to the square knot, except that the first overhand tie is wrapped around the cord or line twice.

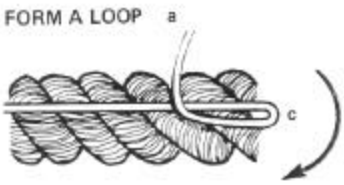
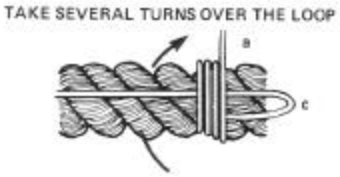
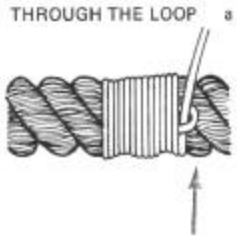
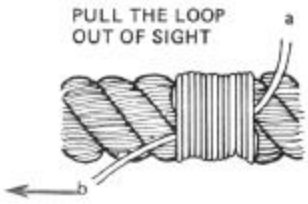
Continued next page

Instructions for making an Eye Splice.

Step	Action	Example
1	Unlay the strands of the line approximately 12 inches.	N/A
2	Make a bight the size of the eye required.	N/A
3	Hold the strands up so that the middle strand is facing you.	
4	Tuck the middle strand "1." **NOTE** Always tuck the middle strand first, and keep the right-hand strand of the side of the line that is facing toward you. All tucks are made from out-board toward you.	
5	Cross strand "2" over the strand just tucked and under the strand just below it.	
6	Turn the entire eye splice over and tuck strand "3."	
7	Pull all the strands tight.	N/A
8	Pass each strand over the adjacent strand and under the next strand until four tucks have been made in each strand.	N/A

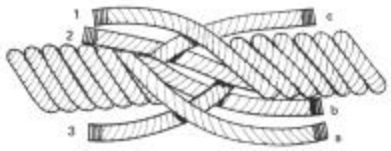
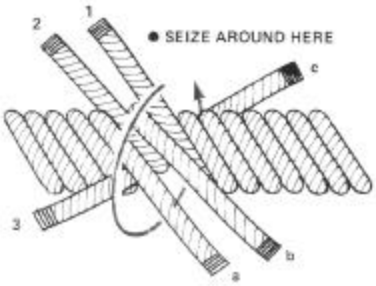
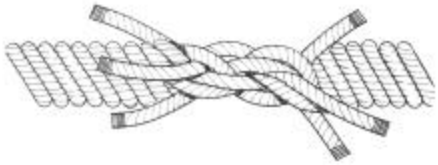
Continued next page

Instructions for making a temporary whipping.

Step	Action	Example
1	Lay the sail twine alongside the line to be whipped.	N/A
2	Form an overhand loop in the sail twine so that the loop extends approximately ½inch beyond the end.	
3	Holding end "a," make a series of turns over the loop toward the bitter end of the line until the length of the turns is about equal to the diameter of the line. Stop within ½inch of the end of the line.	
4	Slip end "a" through the loop "c."	
5	Pull loop end from sight by pulling on "b."	
6	Cut off excess whipping ends.	

Continued next page

Instructions for making a temporary Short Splice.

Step	Action	Example
1	Unlay the strands of the lines to be spliced approximately 12 inches.	N/A
2	Bring the ends together by alternating strands.	
3	Slide the two ends together, that is--**BUTT** them-- and temporarily seize them with sail twine or tape.	
4	Tuck **over** and **under** four times, the same way as in eye splicing.	
5	Remove the seizing (sail twine or tape).	N/A

Enclosure (3) Glossary of Terms

Term	Definition
ABRASION	A fuzzy spot or area on cloth usually caused by rubbing against an object.
ACCESSORY CONTAINER	Part of a survival kit that contains survival items i.e., food, water, and signal devices, etc.
ACCORDION-FOLDS	Folding a canopy into S-shaped layers of predetermined size. Accordion folding produces a packaged parachute in the desired finished shape.
ACID	A fundamental chemical class distinguished by having reactive hydrogen radicals (PH below 7.0). Acids can be extremely corrosive to metal and damaging to fabric.
AGE LIFE	Age life is the period of time that an item may be considered acceptable for service. Age life commences with the date of manufacture and terminates with the time period limitations imposed by the appropriate shelf/service life combinations.
ALKALINE	A substance, which is opposite to an acid, a base. Also, any substance which has the properties of an alkali (metallic hydroxide).
AMBIENT TEMPERATURE	When performing maintenance on survival kits, ambient temperature is considered to be the temperature of the surrounding atmosphere.
ANEROID	A corrugated metal capsule used in aircraft oxygen regulators for sensing atmospheric pressure.
ANTI-SEIZE TAPE	A tape of any of several thin plastic-film materials (such as tetrafluorethylene) characterized by a waxy, oily texture, used to prevent binding between mating surfaces of threaded parts when applied to the male threaded portion.
ARAMIDE	A heat resistant knit material with excellent stability to 700 degrees F. (Replaces polyamide material.)
ASSEMBLY	A grouping of parts fitted together to form a complete unit.
ATTENUATION	Reduction or lessening. For example, sound attenuation is the reduction of ambient noise in an aircraft by use of a helmet equipped with sound attenuating earphones; sonic cup.

Continued next page

Term	Definition
ATMOSPHERIC PRESSURE	Pressure at sea level, expressed as 14.696 pounds per square inch, absolute, or 29.92 inches of mercury column (barometer).
AWL	A pointed tool for piercing small holes in cloth, leather, wood and other soft materials.
BACKSTITCH	A stitch made by inserting the needle a stitch length behind and bringing it up a stitch length ahead of the last stitch. Also, sewing back over a row of stitches.
BAG, BALLAST	An open pouch located on the underside of a raft to allow stabilization.
BAG, SHOT	A bag filled with lead shot used to hold the canopy in place during packing.
BALL, SWAGED	A steel ball that is press-fitted to a cable to ensure maximum strength and security.
BAND, LATERAL	Webbing inserted in canopy skirt and vent hems to reinforce edges and distribute load.
BAND, POCKET	A piece of tape or line attached at the skirt hem and across the radial seam, which causes the gores to be pulled outward at inflation and thus improve opening characteristics of the canopy.
BAND RETAINING	A rubber band used to hold folded suspension lines in a container or faked line together.
BARTACK	A concentrated series of zig-zag stitches used to reinforce points of stress. A bartack shall have 28 stitches per half inch.
BEACON, EMERGENCY RADIO	An automatically actuated transmitter mounted in the survival kit that emits an inaudible beacon signal to attract rescue aircraft.
BEESWAX	A wax that is applied cold or melted to thread to prevent raveling or cloth unknotting and to make thread easier to sew.

Continued next page

Term	Definition
BIAS CONSTRUCTION	A type of canopy construction in which the canopy cloth is cut and sewn so that the center line of each gore runs at a 45 degree angle to the warp and filling thread of the canopy cloth.
BINDING	A piece of tape or fabric folded over and stitched to a raw edge of cloth to prevent raveling or fraying.
BITTER END	The extreme free end of a line or rope.
BODKIN	A large-eyed, blunt needle instrument for inserting thread, tape, ribbon or line through a loop, hem or channel. Used to feed suspension lines through canopy radial seams or to stow suspension line bights in certain parachute container assemblies.
BOLT	A package or roll of cloth of varying widths. Also, a measuring term for 40 yards of material.
BOOT	A flat, fabric-casing incorporating channels to provide for orderly stowage and protection of a drop line or lanyard.
BOTTOM, FALSE	Pieces of cloth sewn to the inside of a pack to retain the frame. It also serves as a base for attaching suspension line hesitater loops.
BREATHING	The pulsating action of the parachute canopy when fully opened.
BUNCHED STITCHING	Stitches too close or more stitches per inch than required.
BURL	A knot or lump in thread or cloth.
BURNS, FRICTION	A hard spot on the suspension line caused by two lines rubbing together at high speeds, generally off color and brittle.
C	Abbreviation for Celsius. A thermometric scale of which the interval between the freezing point and boiling point of water is divided into 100 degrees. 0 degrees C represents the freezing point and 100 degrees C represents the boiling point of water.

Continued next page

Term	Definition
CALENDAR INSPECTION	A detailed, searching inspection for material degradation that may have occurred during the preceding calendar interval and provide an opportunity to perform essential preventative maintenance. The inspections are programmed in multiple calendar weeks.
CANOPY	The main supporting surface of a parachute which, when opened, reduces the rate of descent. It is usually made of nylon and includes a framework of cords, called suspension lines, from which the load is suspended.
CANOPY, FLAT CIRCULAR	A canopy which has the shape of a flat circle or disc when spread out. See also CANOPY.
CANVAS	A heavy, closely-woven cloth of linen, cotton or synthetic fiber.
CARTRIDGE	A cylindrical, non-refillable container.
CASING (SLEEVE)	The outer woven cover of the suspension line.
CAUTION	Indicates danger to the equipment. The caution preceds the step or item to which it refers.
CHANNEL, CANOPY	The space or opening formed by the overlapping of cloth in making of radial seams. The suspension lines pass through the channels and are retained in position. The channels aid in transmitting load from the lines to the cloth.
CLEVIS	A U-shaped metal fitting with a hole in each end to receive a pin or bolt.
CLIP	A device that fastens, holds together, or retains; for example, the clip, which is tacked to a riser and holds the ripcord housing in place.
CLOTH, CANOPY	The cloth used in parachute canopies. It is woven to withstand the impact of air pressure when the parachute opens. The canopy cloth is woven from nylon yarns, usually in a ripstop weave. See also CANOPY.

Continued next page

Term	Definition
CLOTH, NYLON RIP-STOP	A type of nylon cloth utilized in canopy manufacture. The weave pattern of nylon cloth consists of reinforced ribs, in both the warp and the filling, forming a uniform pattern of squares. The cloth is designed to keep hole damage to a minimum when rips or tears develop in the canopy.
COLLAR, VENT	A strip of nylon cloth. One edge is sewn to the vent hem of the canopy so that a collar or cylinder is formed above the top of the parachute. The other edge is hemmed to form a channel for the insertion of a molded rubber ring.
CO_2	Abbreviation for carbon dioxide.
COMBUSTIBLE MATERIAL/ SUBSTANCE	Any material or substance capable of burning in the presence of oxygen.
COMPONENT	Item of equipment making-up part of an assembly; for example, a ripcord housing is a component part of a ripcord assembly.
CONDUIT	A thin, hollow, metal tube that serves to protect and guide a cable or wire.
CONFIGURA-TION	The make-up, size, shape and relative location of parts in an item of equipment and its accessories. This includes the composition of the materials as well as marking details. Government drawings, military specifications and modification instructions specify the configuration of each piece of equipment.
CONFLUENCE POINT	A coming or run together of two or more lines.
CONTAINER	An assembly that encloses and protects the canopy, suspension lines and risers until the parachute is opened. Sometimes called the Pack assembly.
CONTRASTING COLOR	A color which stands out from its background.

Continued next page

Term	Definition
CORDS, CLOSING	Made of type 1-nylon cord approximately 18 inches in length. They are used as an aid in the closing of the parachute container.
COVERALL, ANTl-EXPOSURE	A one-piece outer garment worn to provide protection in adverse, low temperature conditions.
COVER, RAFT	A fabric envelope that is tucked in around the life raft to prevent chafing and facilitate closing the seat survival kit container.
CROSS BOX	A sewing pattern.
CROSS BOXSTITCH	A boxstitch with an X pattern stitch inside. Sometimes called BOX-X STITCH.
CUTTER, PYROTECHNIC	A device which is operated by an explosive charge and is used to cut line or webbing, etc; for example, a static line cutter.
D-RING	A metal fitting shaped in the form of a letter "D."
DART	A short tapered seam.
DEBURR	To remove minor irregularities on the surface of machined metals by grinding or filing.
DIAMETER	The greatest straight distance across a circle: specifically, the greatest distance across a flat canopy, from skirt to skirt, measured when the canopy is lying flat. Used to designate the size of a flat canopy.
DIP	A line or group of lines passing through a group of lines. Also, a group of suspension lines not in proper continuity. See also TWIST.
DISC, ANTI-CHAFING	A circular piece of rubberized fabric installed between the life raft and the metal inflation valve of the carbon dioxide cylinder to prevent damage to the life raft.
DISCONNECT, QUICK	A method of attachment allowing separation of two components by a single, rapid motion or action.

Continued next page

Term	Definition
DISPOSITION	Instructions on what is to be done with items which are obsolete, worn out or beyond repair.
DOFF	To remove or take off an item of clothing or equipment.
DON	To put on an item of clothing or equipment.
DOUBLE STITCH	Two parallel rows of stitches.
DOUBLE-W	A sewing pattern.
DROPPABLE	A hand launched life raft assembly.
DROP TEST	The release of a parachute assembly with a dummy load from an airplane or tower for testing purposes.
DRY LOCKER	A tower or compartment of suitable height that will satisfactorily air fully suspended parachutes.
EDGEROLL	A beading around the border of a helmet shell, protecting the wearer from sharp edges and adds to energy absorption.
EGRESS	Outlet or means of getting out.
ELASTOMER	Any of various elastic substances resembling rubber.
EQUALIZER TUBE	A small corrugated tube that connects the main upper and lower tubes of the 20-man life raft. The equalizer tube allows even distribution of CO_2 to each main tube during inflation. After inflation, a clamp should be attached to prevent leakage from one tube to another, should one tube develop a leak.
EQUIPMENT CONTAINER	A rectangular nylon bag used to store survival and raft repair equipment.
EXPLOSIVE MIXTURE	Any mixture of a combustible material or substance and oxygen capable of violent burning (detonation) either spontaneously or with the external application of heat.

Continued next page

Term	Definition
EXTERNAL WING COMPARTMENT	A compartment for stowing life rafts. Access to the compartment is located on the outside of the fuselage or wing.
EXTRUSION	A raised or grooved surface or edge.
EYE	A small, steel-wire loop; for example, the loops attached to the parachute container into which a hook on a container spring opening band is fastened.
EYELET	A small metal reinforcement for a hole in cloth, similar to a grommet, except thinner and smaller, and having no washer. The eyelet is used to reinforce lacing holes in small covers, etc.
F	Abbreviation for Fahrenheit.
FABRICATE	To make up or construct an item of equipment, accessory or material.
FAIRLEAD	Pulley, ring or hole used to guide a line, to prevent chafing or fouling, or to change its direction.
FAKE	To fold a line or lanyard in a back and forth fashion.
FASTENER, DIRECTIONAL	A snap fastener which can be engaged or released only in one direction.
FASTENER, NON-DIRECTIONAL	A snap fastener which can be engaged or released by applying pressure or pull from any angle.
FASTENER, SLIDE	A type of fastener made of two lengths of tape with a series of metal or plastic scoops fastened to one side of each. A metal slide is provided which causes the scoops to mesh or lock in place as the fastener is closed, or to separate as the fastener is opened. Colloquial: ZIPPER.
FASTENER, SNAP	A metal fastener containing essentially a ball and a socket attached to opposite parts of a material and used to hold mating surfaces together.

Continued next page

Term	Definition
FELT	A cloth made from wool, fur, hair, synthetic fiber, or a mixture of these with cotton. It is made by matting the fibers together under pressure and heat.
FIBER	A natural or synthetic filament (as of wool, cotton, rayon, etc.) capable of being spun into yarn.
FID	A small, flat, hand tool of metal or wood used during the packing procedure to straighten and insert flaps into the container.
FILLING	Threads, which are perpendicular to salvage edges, and extend across the width of cloth.
FITTING, QUICK-RELEASE	A device used to connect and release on instant response.
FITTING, SWAGE	A connection adapter or pin which is fastened to a hole by pressure. It is applied by means of a machine, which compresses the fitting, causing it to tightly grip the cable, or wire to which it is being attached.
FLAMMABLE MATERIAL	Any material capable of being easily ignited and burned with extreme rapidity.
FLAP, CORNER	One of the small, rectangular cloth tabs which are part of the container side flaps and act as protection and reinforcement of the container corners when the parachute is packed.
FLAP, END	A cloth extension on the short sides of the container base which folds over to enclose the canopy. One of the flaps is usually designated as the ripcord flap.
FLAP, SIDE	A cloth extension on each of the long sides of the container base, which folds over and encloses the canopy. Each side flap is designated according to the fittings it carries; for example, locking cone side flap or, grommets side flap.

Continued next page

Term	Definition
FLARING	The process of opening or widening; for example, the method of splitting, taping and stitching the ends of webbing in order to widen and prevent it from slipping through an adapter.
FLOTATION CELL	The inflatable compartments of a life preserver.
FOLDER	A device used as an attachment to a sewing machine to guide and fold cloth.
FRAYED (SUSPENSION LINE)	A fuzzy condition in which short lengths or pieces of thread or yarn protrude from surface of suspension line.
FSCM	Federal Supply code for manufacturers. A five-digit code that identifies the manufacturer of an item and which, for complete identification, should always be shown with its part number.
FUNCTIONAL CHECK	A test which puts an item to use to determine if it operates properly.
FUSELAGE INSTALLED LIFE RAFT	Refers to life rafts stowed within the passenger/cargo compartment of the aircraft.
GAGE/GAUGE	An instrument for measuring pressure. A measurement of size or thickness.
GORE	That portion of the canopy located between two adjacent radial seams and the vent skirt hem. It consists of cloth sections sewn together.
GROMMET	A metal eye and washer used to reinforce a hole in material; for example, grommets on container side flaps.
GROSS WEIGHT	The gross weight of a carbon dioxide cylinder includes the weight of the cylinder, the weight of the carbon dioxide contained by the cylinder, and the weight of the inflation valve attached to the cylinder.
GUSSET	A triangular insert, as in a garment for strengthening or enlarging.

Continued next page

Term	Definition
HANDLE, RIPCORD	The handle secured to the ripcord cable and retained in a pocket located on the LRU-20/A container. Pulling of the handle begins the process of inflation of the life raft.
HARDWARE	Items made of metal such as tools, fittings, fasteners, and appliances.
HARNESS	An arrangement of webbing straps used to support the rescue swimmer during hoist evolutions.
HEAT EXCHANGER	An apparatus in which heat is exchanged from one fluid to another.
HEM	A border or reinforced edge formed by folding cloth back and securing it, usually by sewing; for example, vent and skirt hem of a parachute canopy.
HOLE, CLOTH DAMAGE	Three or more warp and/or filling threads broken at the same location.
HOOK, TENSION	Hooks used to retain the connector links during cargo parachute packing procedures.
HOUSING, RIPCORD	A flexible steel tube encasing the ripcord cable used to protect against accidental release or damage and to serve as a cable guide. Integrated ripcord assembly housings are constructed of vinyl-coated flexible tubing.
KIT BAG, FLYER'S	A container made of canvas or nylon, reinforced with webbing usually with a slide fastener opening.
LIFT WEBS	The parts of parachute harness webbing or riser that extends from the connector links to the shoulder adapters, D-rings or quick-release fitting.
LINE, DROGUE LINK	A line connecting the withdrawal line to the drogue Parachute on MBEU systems which do not employ a guillotine. The drogue link line contains a slide disconnect pin which will separate the line and withdrawal line in case of manual parachute actuation.

Continued next page

Term	Definition
LINE, STATIC	A line used to open a parachute assembly without the necessity of pulling a ripcord manually. A static line is attached to the ripcord and the aircraft or ejection seat. When the line becomes taut, it withdraws the ripcord locking pins or deployment bag, the parachute then opens.
LINE, SUSPENSION	Nylon cords which connect the canopy of the parachute to the harness assembly.
LINE, VENT	Nylon cord which crosses the vent opening of a canopy.
LINK, CONNECTOR	A small, releasable, rectangular metal fitting used to connect the lift webs and suspension lines.
LOCKSTITCH	A common sewing-machine stitch formed when the thread in the needle goes through the material and connects with the bobbin thread. The needle and bobbin thread should lock in the center of the material thickness.
LOCKWIRE	A wire that prevents loosening of a securing device.
LONG BAR	A long metallic or wooden bar used in parachute packing and used as an aid in closing a parachute container.
LOOP	A warp or filling thread pulled out to form a loop on a cloth surface.
HYDROSTATIC PRESSURE	Pressure or force per unit area exerted by a motionless liquid against the surface of a container.
HYDROSTATIC TEST	This is a permanent volumetric expansion of multi-place life raft CO_2 cylinders. This test is conducted hydrostatically every 5 years at 5/3, the working pressure of the tested cylinder.
IAW	Abbreviation for, In Accordance With.
INFLATION ASSEMBLY	Inflation valve and carbon dioxide cylinder as a unit.
INNER CORE	Five to nine internal yarns (number depending on type) for suspension lines which are covered by a woven sleeve or casing.

Continued next page

Term	Definition
INSPECTION	A close examination for damage, wear, dirt and serviceability.
KEEPER	Small strip of tape or loop used to retain an object; for example, riser and back pad keepers.
LOOP, HESITATER	One of a series of webbing or tape loops which holds suspension lines in an orderly position in the container when the parachute is packed and which pays the lines out in sequence for orderly deployment of the canopy assembly.
LOOP, LOCKING	A loop sewn to deployment bag or canopy to allow full extension of suspension lines before opening of the canopy.
LOOP, RETAINING	Webbing or tape loop used to hold folded lines or excessive webbing in position.
LOOSE STITCHES	Thread that does not lie smoothly on the surface of the cloth.
LUMP	An internal imperfection of a suspension line that feels hard to the touch. It is usually caused by internal knots in core yarns or casings or by slippage or displacement of one or more inner core yarns near an overlap.
MARGIN	The space from the outer row of stitching to edge of fold of the cloth.
MANUFACTURER'S CODES	Identification codes for every manufacturer listed as a procurement source in accordance with cataloging handbooks H4-1 and H4-2, Federal Supply Codes for Manufacturers.
METHYL ETHYL KETONE (MEK)	A colorless, flammable alcohol used in lacquers, paint removers, cements and adhesives, celluloid and cleaning fluids.
MILDEW	A damaging fungus or mold which forms on cloth and leather. Dampness and the absence of fresh air and sunlight cause it.
MIS-PICK	An extra or incorrectly positioned filling thread.
MISSING PICK	A filling yarn (pick) wholly or partially missing.

Continued next page

Term	Definition
MISSING STITCHES	A space between stitches in same row in which there is no thread.
MULTIPLACE	Capable of holding more than one person.
NEEDLE DAMAGE	Where needle penetration has damaged threads in the cloth.
NOTE	An information item. A note may precede or follow the item or step to which it refers.
OVEREDGE	The stitching around the outer edge of cloth to prevent the edges from raveling or fraying.
OVERFOLD	An excess of material causing edge of inner-fold to double, wrinkle or pleat.
OVERLAP	To extend over and cover a piece of cloth.
OVERLAP, CORE	The overlapping of an incoming and outgoing suspension line inner core line.
PACK	To put together compactly; to store neatly; for example, the act of packing a parachute consists of stowing suspension lines and canopy in the container assembly in such a way as to ensure safe storage and proper opening of the parachute assembly.
PALM SEWING	A hand protector which is used when sewing.
PARACHUTE	A device that offers resistance to the air, thereby decreasing the velocity of a descending body to permit landing at a suitable rate of descent.
PARACHUTE ASSEMBLY	A complete parachute, including the canopy assembly, container assembly, harness assembly and riser/liftweb assembly.
PARACHUTE, CARGO	A parachute used to airdrop materials such as food, water, explosives, clothing, weapons and supplies.

Continued next page

Term	Definition
PARACHUTE, DROGUE	An auxiliary parachute used with any system that requires some method of deceleration or stabilization; for example, HU-25 drogue chute.
PARACHUTE, PILOT	A small, spring-operated, cloth-covered auxiliary parachute which is usually constructed on a steel wire frame and attached to the peak of the canopy. It accelerates the withdrawal of the canopy from the container. The pilot parachute is packed under tension and immediately opens when released from the container.
PARAFFIN	Wax generally used with 50 percent beeswax as a hot dip to prevent the fraying of cut ends of webbing, cord and tape. See also Beeswax.
PEAK	The top center of the parachute canopy, the point at which all vent lines cross. Also called apex or crown.
PERMEABILITY	The measured amount, in cubic feet, of the flow of air through a square foot of cloth in 1-minute under a specified pressure.
pH VALUE	An indication of the acidity or alkalinity of a solution. A reading of pH may be made by the use of test strips. A reading below 7.0 indicates an acid. A reading above 7.0 indicates an alkaline.
PICK	A cloth filling thread, taken as a unit of fineness of cloth.
PLEAT	Folds sewn in cloth.
POCKETS, DEFLATION	Pockets sewn to the canopy at the skirt hem. After landing in water, they serve to anchor the canopy, causing the canopy to deflate. This prevents the canopy from dragging the equipment through water.
POLYMIDE CLOTH	Fire resistant synthetic cloth.
POROSITY OF A FABRIC	The measured amount, in cubic feet, of the flow of air through a square foot of fabric in 1-minute under a specified pressure. Also known as PERMEABILITY.
PREMATURE OPENING	Any accidental opening of a parachute, which occurs prior to intended deployment.

Continued next page

Term	Definition
PROTRUDING YARN (Core Casing or Thread)	A condition in which either the inner core yarns extend through the casing, or where the yarn or threads extend beyond the surface of the casing itself.
PUSHPIN	A straight pin used to temporarily secure material while sewing.
PYRO-BOX	The container used to store pyrotechnic devices such as flares and cartridges while they are removed from the ammunition storage area.
PYROTECHNIC DEVICE	Any device which either burns or explodes or uses burning or exploding to operate a system. Examples of pyrotechnic devices are static line cutters, ballistic spreading guns and automatic actuators.
RATE OF DESCENT	The speed at which a parachute descends through the air. The rate varies according to atmospheric pressure, weight of load, movement of air (updraft and downdraft) and size, design and condition of canopy.
RAVEL (UNRAVEL)	To separate, untwist or unwind, leaving a frayed or ragged edge. Ravel is the preferred word to describe such a condition.
REINFORCE-MENT	Any strengthening which enhances the basic integrity of an assembly; for example, the tape or webbing used to strengthen parts of a canopy, container, harness, etc., in a parachute assembly. See also WEBBING, REINFORCEMENT.
REPAIRS, MAJOR	Repairs requiring special equipment, personnel or materials normally not available at intermediate or local levels of maintenance.
REPAIRS, MINOR	Repairs that can be effected at intermediate or local levels of maintenance.
RETAINING SLEEVE	A series of stowage tunnels.
RFI	Abbreviation for Ready For Issue.
RIG	To assemble and adjust, to equip. For example, the act of rigging a parachute assembly consists of assembling all component parts in preparation for packing.

Continued next page

Term	Definition
RING, VENT	A molded rubber ring in the vent collar. It stretches when the air rushes into the canopy as the parachute begins to inflate.
RISER	The webbing which connects the rescue equipment harness to the cargo parachute assembly. The riser is composed of two lift-webs and there are two risers on each parachute assembly.
RUNOFF	Sewing not on a seam or cloth.
RUPTURE	One or more yarns of suspension line casing being cut or severed, sometimes exposing the inner core. Occasionally, tears, cuts or other forms of damage to the canopy are defined as a rupture when caused by dynamic load conditions.
SAFETY-TIE	A low strength thread that serves to indicate that an assembly has not been damaged tampered with or opened since the last regular inspection.
SAFETY-WIRE	Low strength wire which serves to inhibit premature opening, discharge or separation.
SCRAP	To discard, with proper authorization, items, parts or materials that are obsolete or no longer usable.
SEAM	A series of stitches joining two or more pieces of cloth. For government work, the type of seam is indicated by a symbol, which gives the class of seam, the number of stitching, and the number of rows of stitching.
SEAM DIAGONAL	A French-fell seam of the canopy which joins two sections of a gore. Diagonal seams meet the centerline of the gore at angles of 45 degrees and 135 degrees.
SEAM ENGLISH-FELL	A seam in which one piece of cloth is folded back upon itself and the other piece is a plain overlap.
SEAM OVERLAP	A seam in which the two pieces of cloth are joined by overlapping enough to accommodate one or more rows of stitching.

Continued next page

Term	Definition
SEAM RADlAL	A seam, joining two gores, which extends radially from the vent to the skirt hem.
SEAR	To melt or seal with heat; for example, to sear the end of nylon webbing one heats the end until the nylon melts and fuses. This prevents raveling. Also, the catch that holds the hammer of a firing mechanism cocked. The sear in an automatic actuator is attached to the aneroid in the receiver assembly.
SUIT, ANTI-EXPOSURE	A garment worn to provide protection in adverse, low temperature conditions.
SELVAGE	An edge of a woven fabric so formed as to prevent raveling, as compared to a cut edge, which will ravel.
SELVAGE, BROKEN	Cut, broken or torn selvage edges.
SELVAGE, STRINGY OR LOOPY	Irregular stringy or loopy selvage edge.
SEPARATOR, SUSPENSION LINE	A tool used to aid in keeping suspension lines and canopy skirt in order while packing a parachute.
SERVICE LIFE	The time period during which the item can be maintained in service without replacement.
SERVICING PARACHUTES	Inspecting, cleaning, repairing and repacking parachutes at periodic (calendar) intervals. Periodic intervals for parachutes shall correspond either to the aircraft calendar inspection or to the phased maintenance inspection cycle program as directed by applicable MPC. In no case shall an interval exceed 180 days.
SERVING	A method of wrapping or binding the ends of a cord or a line so it will not ravel. Sometimes referred to as whipping.

Continued next page

Term	Definition
SEWING MACHINE	A machine with a power-driven needle, used for sewing and stitching.
SHEARS, PINKING	Shears with a saw-toothed inner edge on the blades for making zigzag cut.
SKIPPED STITCHES	Threads that are not interlocked.
SKIRT, CANOPY	The lower edge of a canopy.
SLUB	An abruptly thickened place in cloth caused by manufacturer's defect.
SMASH	Abrasion damages which causes broken warp and filling threads and weaves separation.
SPI	Abbreviation for stitches per inch.
SQUIDDING	A state of incomplete canopy inflation in which the canopy has a squid or pear-like shape.
STAND, CONTAINER	A rigid stand used to hold some parachute containers, such as the Falcon drogue chute, during part of the packing procedure.
STATIC LINE CUTTER	A device used to cut the static line to free the parachutist and prevent entanglement.
STITCH, BASEBALL	A stitch used in repair and patching of fabrics.
STITCH, BASTING	A long, loose stitch made with single or double thread. Used to temporarily hold two or more pieces of material.
STITCH, BOX	Rectangular stitch used to attach and reinforce.
STITCH, BUTTONHOLE	A reinforced stitch made on the edge of a slit or hole. Each individual stitch forms a half hitch. The type of material used determines the distance from the edge and the spacing of the stitches.

Continued next page

Term	Definition
STITCH, OVERTHROW	A stitch used to repair weakened seams, to reinforce slide fasteners and to join two pieces of material together.
STITCH, ZIG-ZAG	A stitch made by sewing machine, which stitches alternately on two or more parallel lines; for example, it is used to reinforce and anchor the suspension lines to the canopy. The number of stitches per inch is determined by counting the number of points on one side per linear inch.
STITCHES PER INCH	The number of needle penetrations where threads are interlaced, per linear inch.
STRIP BACK	Broken thread filament(s) wrapped around the remaining thread forming an enlarged area on cloth.
STRAP, CHEST	The harness webbing which is secured across the chest with a snap and a V-ring to prevent the wearer from falling out of the harness.
STRAP, LEG	That part of the harness webbing which encircles the wearer's leg. The leg straps are adjustable.
STRAP, PILOT PARACHUTE CONNECTOR	Tubular nylon webbing which joins the main parachute and the pilot parachute.
STRAP, SHOULDER	The part of the harness webbing which crosses the wearer's back at the shoulder blades.
STRAP, TENSION	A strap which attaches to the apex of a canopy to keep the canopy and suspension lines taut during parts of the packing procedures.
STOWING	The act of putting away in a neat orderly way. Stowing of suspension lines involves inserting the lines into the hesitater loops or stowage channels in such way as to ensure proper paying out of lines when the parachute is opened. Stowing of the canopy involves folding and inserting the canopy into the container in such a way as to ensure proper opening of the canopy when the parachute is used.

Continued next page

Term	Definition
SURVEY	A formal process by which accountable equipment is withdrawn from service or removed from records.
SWAGE	To attach a device to a cable by means of pressure. A swaging machine compresses a fitting, causing it to grip tightly to the cable to which it is being attached.
T-HANDLE	A handle in the shape of the letter, "T."
TACK (HAND TACK)	To attach temporarily prior to final sewing. Also, to tie temporarily as an aid in positioning. Also, to permanently secure portions of a parachute together; for example, the attachment of a seat cushion to a parachute container assembly.
TAPE, CLOTH	A narrow woven ribbon of cotton, linen, nylon, or other material.
TAPE, FILAMENT	An adhesive tape with fiber cords in the backing. The cords are usually fiberglass, nylon, linen, or other high strength material. This tape has high tensile strength along the lengthwise direction.
TAPE, HOOK	Strip of nylon tape with small nylon hooks on one side. Hook tape issued with pile tape as a fastener.
TAPE, PILE	A strip of nylon tape with small nylon loops on one side. Pile tape is used with hook tape as a fastener.
TAPE, SURGICAL	A white linen or cotton tape with adhesive on one side. Commonly called adhesive tape.
TEAR STRENGTH	The average force, expressed in pounds, required to continue a tear either across the filling or warp of cloth.
TEMPLATE	A pattern or gage commonly in the form of a thin plate of cardboard, wood, or metal. It is used as a guide in the layout or cutting of flat work.
TENSILE STRENGTH	The greatest stress cloth can withstand along its length without rupturing, expressed as a number of pounds per square inch (of cross section).

Continued next page

Term	Definition
THIN SPOT (Suspension Line)	A condition whereby the diameter of the suspension line is seen visually to be less than other portions of the suspension line. Broken inner cord yarn(s) or an improper overlap normally causes this condition.
THREAD, SEPARATION	A bunching of threads in cloth, leaving a hole or separation in the cloth. A thread separation can run either with the warp or filling of a cloth.
TIGHT STITCHES	Thread under excess tension causing one sewing thread to lie on the surface of the cloth or causing puckering of the cloth.
TORQUE	A force or combination of forces that tend to produce a rotating or twisting motion. Torque is often expressed in inch-pounds or foot-pounds. A torque wrench is used to apply a measured torque.
TOTAL LIFE	Total life is the period of time commencing with the date of manufacture that an item may be retained in a packaged, out-of-service condition and remains acceptable for service.
TUBE, GUIDE	A narrow tube used to guide the vane-type pilot parachute grommet over its locking cone.
TWIST	Rotation of the suspension line casing induced generally during final assembly of the canopy, suspension lines and connector links.
TWIST OF THREAD OR CORD	The direction (right or left) in which the strands of thread or cord are wound around one another. If the thread unwinds when turning it to the left, it is right twist; if it tightens, it is left twist. Right twist is also known as Z-twist. Left twist is also known as S-twist.
UNDERFOLD	Insufficient cloth folded inside a seam. The raw edges of cloth will show when underfold is excessive.
UNEVEN STITCHING	Stitching wavy or number of stitches varying.
UNTACK	To remove a tacking. See also TACKING.
V-RING	A metal fitting shaped in the form of a closed letter “V.”

Continued next page

Term	Definition
V-TAB	Webbing reinforcement at the point where the suspension line enters the canopy.
VENT	The circular opening at the peak or top of the canopy. As the parachute opens and descends, some of the air in the canopy escapes through this vent, thus reducing the strain on the canopy and steadying descent. It is about 18 inches in diameter for personnel parachutes.
WARNING FLAG	A tag attached to an assembly indicating that the assembly is not operational. Often the flag is attached to safety pins on pyrotechnic devices to indicate necessity of removal before operation. Also, it is used to flag defective or incomplete equipment to preclude use.
WARP	Threads that run parallel to the selvage edge of cloth; those that are crossed by the filling threads.
WEAVE	To manufacture a web or cloth on a loom by interlacing the warp and filling yarns. Also the particular pattern employed in weaving cloth. The cloth for parachute use is one up and one down (plain weave), two up and one down (twill weave), or rip-stop.
WEAVE SEPARATION	Looseness of weave caused by strain or poor weaving.
WEB (WEBBING)	A strong, narrow, closely-woven tape of synthetic, cotton or linen fiber designed for bearing weight. For example, it is used in the manufacture of the parachute harness.
WEBBING, ELASTIC	Webbing having elastic warp threads to give it greater elasticity than regular webbing. It is used in the fabrication of elastic ripcord pockets.
WEBBING, REINFORCEMENT	Short lengths of webbing sewn to the skirt hem at the junction points of the suspension lines and the canopy.
WEBBING, TUBULAR	Strong synthetic or natural fiber webbing woven in the form of a tube.

Continued next page

Term	Definition
WET LOCKER	A tower or compartment maintained for hanging parachutes that are damp or have been immersed in water.
WHIPSTITCH	A stitch used to join two pieces of webbing and to reinforce weak seams.
WHISKER	A thread filament protruding from cloth.
YOKE AND PLATE ASSEMBLY	The removable end of a connector link.

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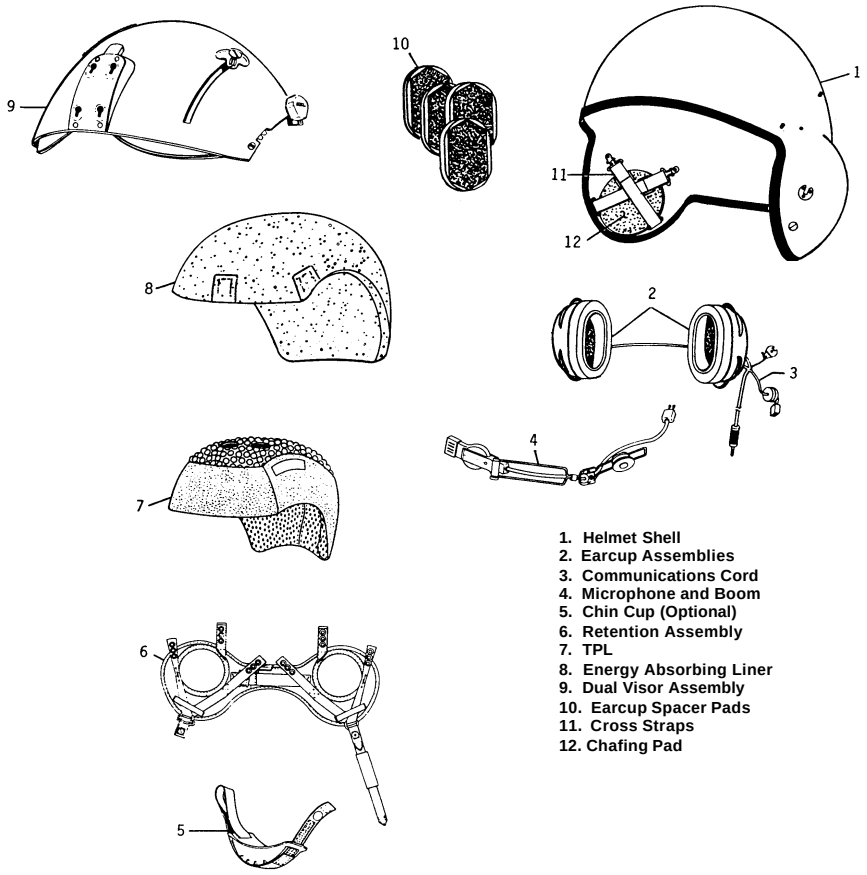
Section A. SPH-5CG Helmet Overview

A.1. SPH-5CG Helmet Introduction

The SPH-5CG is a lightweight helmet assembly providing head protection, noise reduction, and communication enhancement for helicopter personnel.

A.2. SPH-5CG Configuration

The SPH-5CG helmet assembly features a dual visor system with a mounting platform for night vision goggle (NVG) attachment. The helmet assembly consists of an energy absorbing Styrofoam liner and a preformed thermoplastic liner (TPL); a yoke style retention with adjustable chin and nape straps; and a communications assembly featuring a quick-disconnect, boom-mounted microphone and sound attenuating earcups. The helmet is available in three sizes; small, medium, and large. The helmet and components are shown in figure Encl. 4-1 and are discussed in the following sections:



Encl 4-1 SPH-5CG Helmet Components

Continued next page

A.3. SPH-5CG Helmet Shell

The SPH-5CG helmet shell is made of nylon, graphite, and fiberglass cloth composition with black rubber edge beading. Two cross straps and a chafing pad, located inside the helmet at each earcup area, improve earcup to head tension and prevent earcup chafing on the shell. Two helmet shell sizes (medium and large) are used for the three sizes of helmets. The helmet shell size medium is used for the small and medium helmets, and the size large shell is used for the size large helmet.

A.4. SPH-5CG Liner System

The SPH-5CG helmet incorporates a two-part liner system. The energy absorbing liner attaches to the inside surface of the helmet shell and provides impact protection. The preformed thermoplastic liner (TPL) seats inside the energy absorbing liner and provides a comfortable inner helmet liner which can be custom fit to an individual head size. Together they maintain an approximate -inch offset between the head and outer shell surface. Both liners are available in medium and large.

A.5. SPH-5CG Energy Absorbing Liner

The primary purpose of the energy absorbing liner is to absorb and reduce impact forces. The liner is formed from rigid foamed polystyrene plastic and is molded to conform to the contour of the inner shell surface (see figure Encl. 4-1). Hook fastener tabs on the outside surface of the liner mate with pile fastener on the inside of the shell to secure the liner in place. Hook fastener tabs on the inside surface of the liner secure the TPL to the energy absorbing liner. The energy absorbing liner is available in four sizes small, medium, large, and extra large.

A.6. SPH-5CG Thermoplastic Liner (TPL)

CAUTION

Do not store helmet in a closed cockpit or automobile. Greenhouse effect heat can cause temperatures to exceed 200 °F (93.3 °C) on an 85 °F (30 °C) day and damage the helmet.

The preformed TPL consists of a plastic layer assembly and a removable, washable cloth cover (see figure Encl. 4-1). The TPL cloth cover is ventilated black fabric featuring sides made of pile material to allow attachment to the hook fastener tabs on the energy absorbing liner.

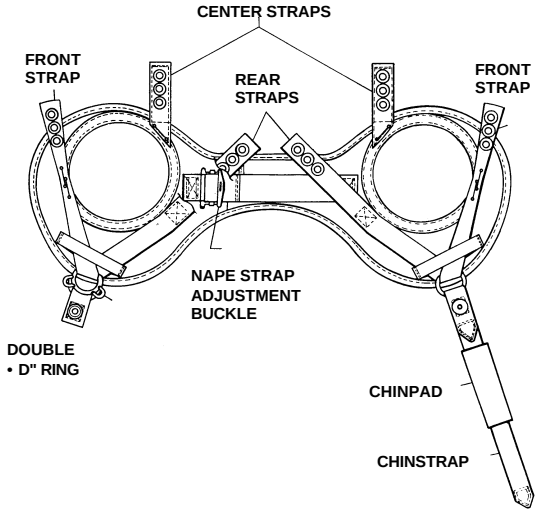
Continued next page

A.6. SPH-5CG Thermoplastic Liner (Continued)

The TPL is preformed in sizes small, medium, and large to fit a majority of head sizes without requiring custom fitting. However, if necessary, the TPL can be heat softened and custom fit to an individual head shape.

A.7. SPH-5CG Retention Assembly

The yoke style retention assembly is designed to minimize forward rotation of the helmet and improve overall helmet retention. The retention assembly chinstrap employs a double D-ring design for attachment and an adjustable nape strap at the rear (see figure Encl. 4-2). An adjustment buckle over the back of the nape strap allows further tightening of the retention assembly in the nape area. An optional chin cup (see figure Encl. 4-1) is available for use when wearing NVGs. The chin cup snaps over the chinstrap D-rings and helps minimize forward movement of the helmet when using NVGs. Depending on crewmember preference, the use of the chin cup in conjunction with NVGs may eliminate the need for counterbalance weights normally worn on the rear of the helmet.

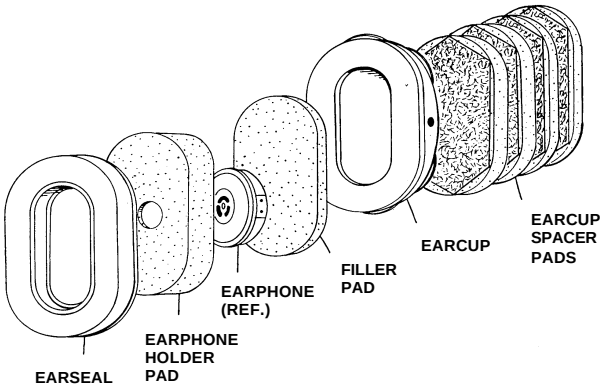


Encl. 4-2 Retention Assembly

Continued next page

A.8. SPH-5CG Earcup Assembly

Each group assembly consists of a contoured plastic earcup, cushioned earseal, foam earphone holder, and spacer pad set (see figure Encl. 4-3). The contour of the earcup assists in increasing the fit to the wearer's head and the cushioned earseal with the raised inner ring design helps increase sound attenuation and comfort. The earcups attach to the retention assembly and can be rotated within the retention assembly to further enhance the fit. The spacer pad set consists of two thin (¼-in) and two thick (½inch) pads. The pads may be trimmed as necessary to achieve the best fit. The size and number of pads placed behind the earcups to improve earcup fit depends on the crewmember's comfort and sound attenuation needs.



Encl. 4-3 Earcup Assembly

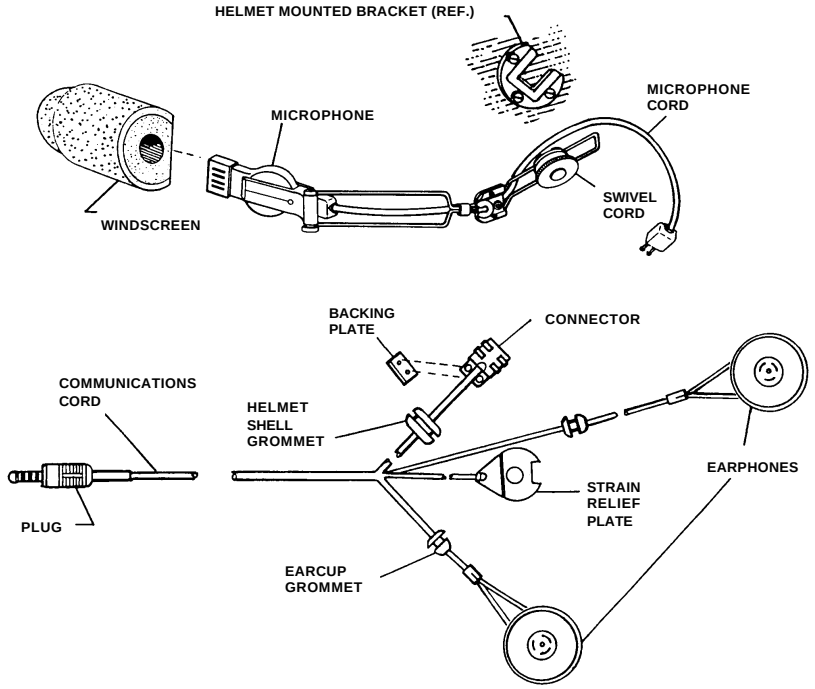
A.9. SPH-5CG Communications Assembly

The SPH-5CG helmet communications consist of a quick-disconnect, boom-mounted microphone, a swivel assembly, dual earphones, a microphone cord, and a rear-mounted connector (see figure Encl. 4-4). The quick-disconnect feature allows installation or removal of the boom-mounted microphone and swivel assembly without requiring tools or disassembly of the boom. The boom-mounted microphone and swivel assembly slide into (or out of) a bracket mounted on the helmet. The knob on the swivel assembly hand-tightens or loosens the microphone as required. The microphone is covered with a foam pad to reduce wind interference. The microphone cord extends from the microphone and plugs into a connector mounted on the left rear of the helmet shell.

Continued next page

A.9. SPH-5CG Communications Assembly (Continued)

The connector is part of the communications cord, which extends to an earphone inside each earcup and also to a radio and intercom plug, which extends from the rear of the helmet.



Encl. 4-4 Communication Assembly

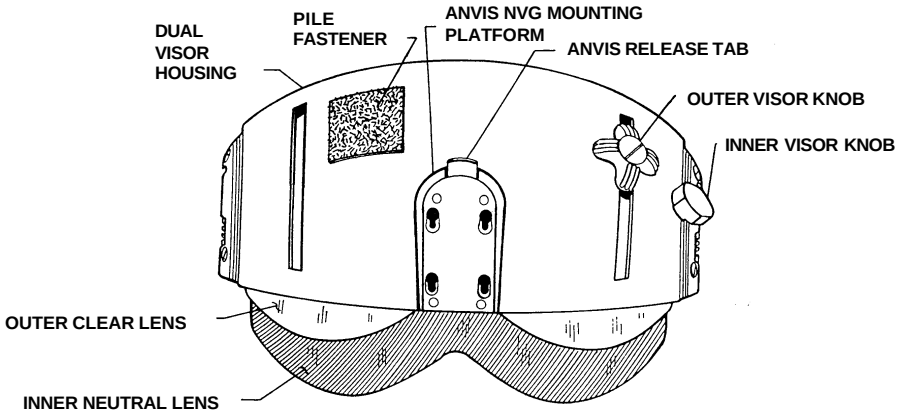
A.10. SPH-5CG Dual Visor Assembly

The SPH-5CG helmet dual visor assembly features an inner neutral visor, an outer clear visor, and a mounting platform for attachment of NVGs (see figure Encl. 4-5). The inner visor control knob is located along the left side of the visor housing and can be locked in a down position at one of three separate settings. The outer visor control knob is installed in the left side slot of the visor housing and can be locked in place at any position. The outer visor control knob may be changed to the right side to permit right hand operation of the outer visor if so desired (refer to Encl.4, section F.9).

Continued next page

A.10. SPH-5CG Dual Visor Assembly (Continued)

The center of the dual visor housing serves as the mounting platform for ANVIS-6 NVG attachment. The ANVIS-6 NVG mount snaps onto and is locked in place by the housing mounting plate (see figure Encl. 4-5). The NVG mount is quickly removed by depressing the spring-loaded tab at the top of the mounting plate. A 2 x 2-inch piece of pile material (supplied with the helmet) attaches to the visor housing to assist in anchoring the ANVIS-6 cable.



Encl. 4-5 Dual Visor Assembly

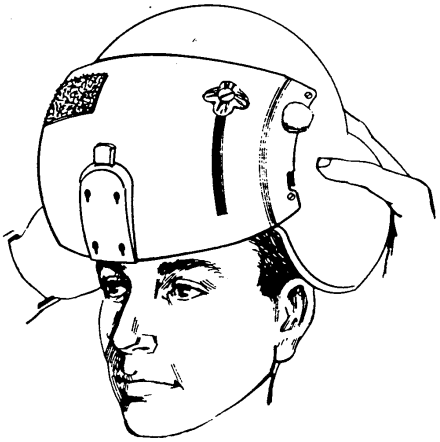
Section B. SPH-5CG Helmet Operating Procedures

B.1. Donning Helmet

CAUTION

Spread helmet only enough to allow ease of donning. Excessive spreading may result in damage to helmet.

The SPH-5CG shall be donned as follows:

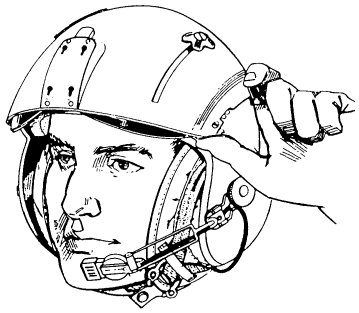
Step	Action	Example
1	Hook thumbs over earcups and spread helmet slightly apart.	
2	Position front edge firmly against the forehead as shown in the example and roll helmet back and down onto head.	
3	Press helmet firmly downward with both hands to ensure helmet is properly seated on head.	N/A

Continued next page

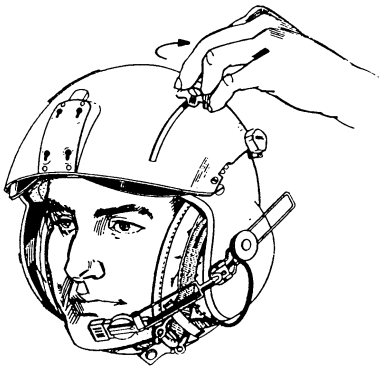
B.2. Dual Visor Assembly Operation

The following are operating procedures for the dual visor assembly.

The table below provides operating procedures for the inner visor.

Step	Action	Example
1	Unlock visor by pushing down on actuator knob.	
2	Raise/lower visor by sliding knob along track while holding knob down.	N/A
3	Lock visor by releasing actuator knob.	N/A

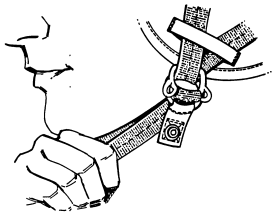
The table below provides operating procedures for the inner visor.

Step	Action	Example
1	Unlock outer visor by turning center lock knob.	
2	Rotate visor by sliding knob along slot.	N/A
3	Lock visor by turning knob until secure.	N/A

Continued next page

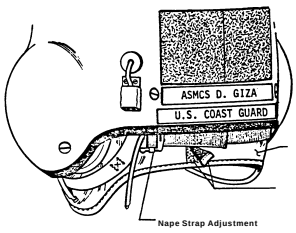
B.3. Chinstrap Operation

Fasten and release chin strap as follows:

Step	Action	Example
1	Feed end of chinstrap through D-rings.	
2	Split D-rings apart, loop chinstrap end back through inner D-rings and pull chinstrap through D-rings.	N/A
3	Tighten chinstrap to desired tension.	N/A
4	Release chin strap by splitting D-rings and pulling on chinstrap.	N/A

B.4. Nape Strap Operation

Fasten and release nape strap as follows:

Step	Action	Example
1	With helmet properly oriented on head, adjust nape strap to desired tension and fasten ends together.	N/A
2	Pull strap through adjustment buckle and tighten to desired tension.	N/A
3	Release nape strap tension by pulling strap back through adjustment buckle.	

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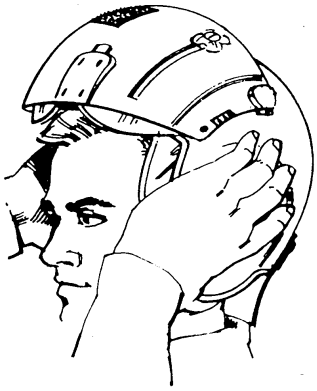
B.5. Doffing Helmet

CAUTION

Spread helmet only enough to allow ease of doffing. Excessive spreading may result in damage to helmet.

The SPH-5CG shall be doffed as follows:

Step	Action	Example
1	Hook thumbs in earcups and spread helmet slightly at earcup area.	
2	Roll helmet upward to rear and off head.	N/A

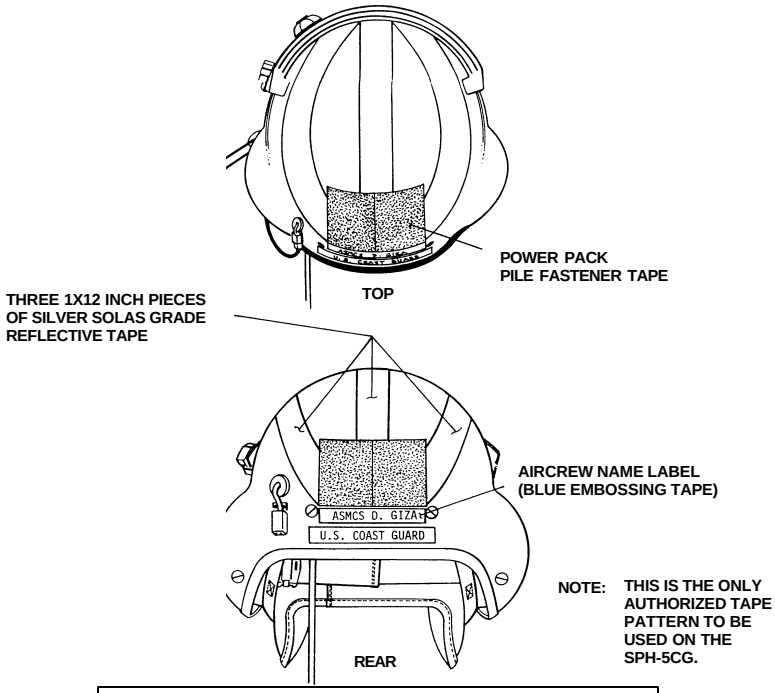
Section C. SPH-5CG Helmet Modifications

C.1. Addition of Reflective Tape

The purpose of the addition of reflective tape to the helmet is to provide improved detectability of downed aircrew. Three pieces of 1 x 12-inch silver SOLAS grade reflective tape shall be placed on the helmet shell as shown in figure Encl. 4-6. This is the only authorized taping pattern to be used on the Coast Guard SPH-5CG helmet.

C.2. Addition of Pile Tape

Three pieces of self-adhering (peel and stick) pile tape are included with each helmet assembly. The 2 x 2-inch piece of pile tape is for the attachment of the CG-1 distress signal, and shall be placed on the helmet visor as shown in figure Encl. 4-7. The two, 2 x 3-inch pieces of pile tape are for the attachment of the ANVIS-6 power pack and shall be placed on the helmet as shown in figure Encl. 4-6 and Encl. 4-8.



Encl. 4-6 Reflective and Pile Tape Modifications

C.3. Addition of Aircrew Name Label

The name of the aircrew shall be placed on the back of the helmet as shown in figure Encl. 4-6. The label shall be made by placing the individual's rank/rate, first initial, and last name on -inch blue embossing tape.

Continued next page

C.4. ANVIS-6 Quick Mount Modification

Prior to attaching ANVIS-6 NVGs to the SPH-5CG helmet, the ANVIS mount must be modified. A modification kit is available and contains the required parts. The kit consists of a cable strain relief clamp, four locating pins (two top, two bottom), a backing plate, and a 1 x 1-inch piece of self-adhering hook fastener (see figure Encl. 4-7 and Encl. 4-8). Once assembled, the mount will provide one handed, in-flight attachment and removal capability. Perform the modification as follows:

Step	Action
1	Remove nut from right side (as worn) of ANVIS mount and place strain relief clamp over end of screw threads.
2	Place wires under clamp arm and replace nut over screw threads and clamp. Tighten nut until secure.
3	Position backing plate on rear of mount so that each screw hole lines up and plate is flush with top and bottom of rear of mount. Ensure wires extending from rear of mount are aligned in slots in mount to prevent crushing of wires.
4	Apply a small amount of threaded adhesive to each locating pin and secure backing plate to the rear of the mount using locating pins. Pins with longer, tapered heads are installed in top two holes. Tighten until secure but do not over-tighten.
5	Remove backing from hook fastener and wrap it around cable connector until ends meet.
6	Attach mount to helmet by lining up the locating pins with the slots in the mounting platform on helmet. Insert pins into slots and pull mount down until it clicks into place. Attach hook fastener on connector to pile material on visor housing.
7	Remove mount from helmet by depressing release tab on top of mounting platform and lifting mount up and off helmet.

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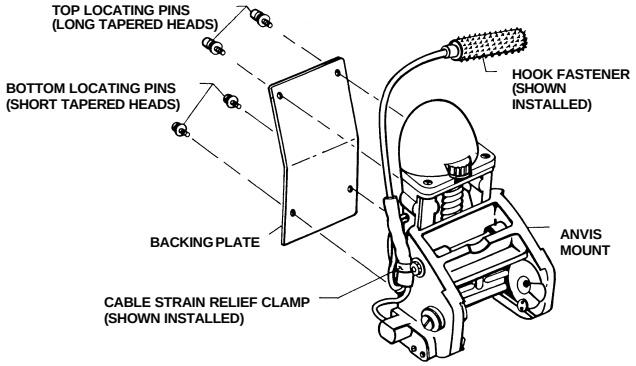
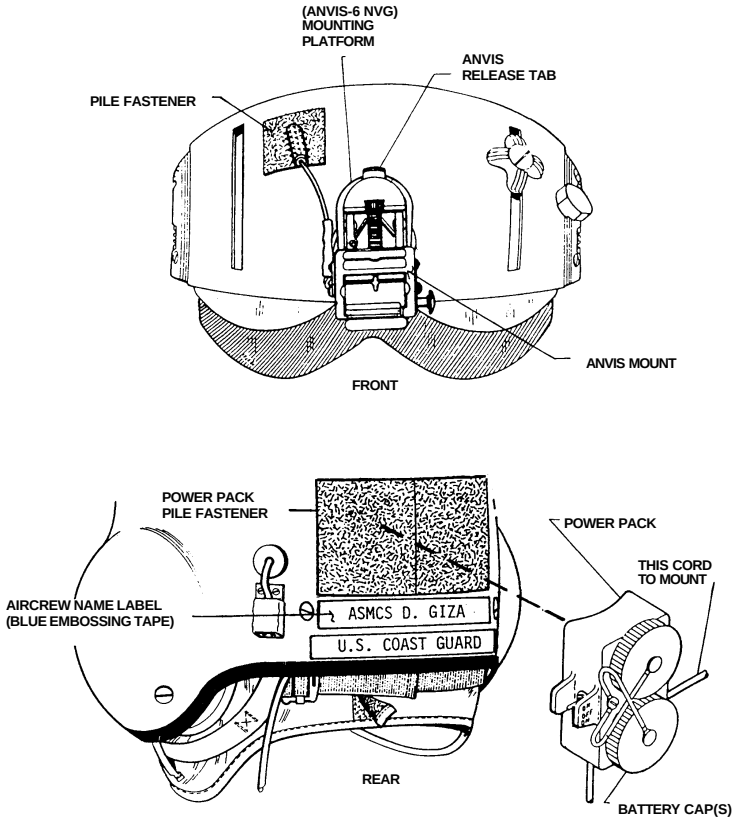
C.4. ANVIS-6 Quick Mount Modification (Continued)

The following is the continuation of ANVIS-6 Quick Mount modification.



Encl. 4-7 ANVIS Modification Kit



Encl. 4-8 ANVIS Quick Mount Attachment

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Section D. SPH-5CG Helmet Sizing and Fitting

D.1. SPH-5CG Sizing and Fitting Special Tools

The following are special tools and test equipment required for fitting, assembly, or maintenance of the SPH-5CG helmet assembly.

Quantity	Nomenclature	Use and Application
1	Electric Thermal Drying Oven or equivalent	To heat soften TPL during TPL fitting process.
1	Oven Thermometer	To monitor oven temperature during TPL heating.
1	Caliper	To determine head dimensions during TPL fitting process.
1	Ruler	To measure head dimensions during TPL fitting process. Ruler must be graduated in centimeters or tenths of inches.

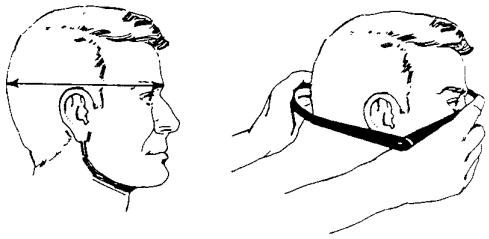
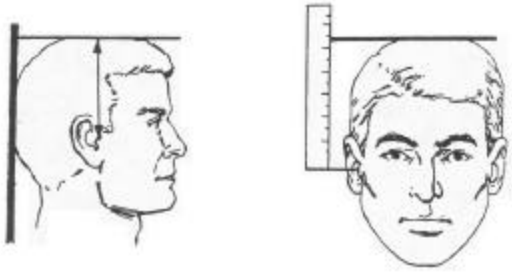
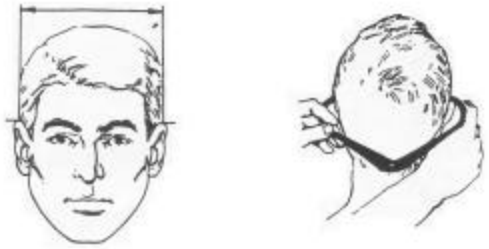
D.2. SPH-5CG Sizing

Helmet sizes are small, medium, and large. To determine proper helmet size, head measurements must be taken. Use the following procedure to obtain correct head measurements and corresponding helmet size. Refer to Encl. 4, section D.1 for required support equipment. Head measurement definitions used in this procedure are in accordance with the document *Anthropometry and Mass Distribution for Human Analogies*, Volume I; *Military Male Aviators* (NADC 88036-60).

Continued next page

D.3. Sizing Measurement Procedures

To properly size a crewmember for an SPH-5CG, use the following measuring procedures and compare the measurements with the sizing charts below.

Step	Action
1	Measure head length of crewmember using a caliper and ruler. The head length measurement is obtained by measuring longest distance of head from midpoint on forehead between the browbridge (glabella landmark) to back of head where it protrudes most (occiput). 
2	The head height measurement is obtained by measuring the distance from the middle of the notch at the front of ear (tragion) to top of head. This measurement is best obtained using a headboard and a ruler. 
3	The head breadth measurement is obtained by measuring the maximum horizontal width of the head above the ears. 

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D.3. Sizing Measurement Procedures (Continued)

Use the following chart and the crewmembers head measurements to determine the proper helmet size needed.

If head length measurement falls into:	And head height is:	Then:
The small (see head length chart below)	Less than 5.3 inches	Use the small helmet.
	5.3 inches or more	Select size from head breadth chart below.
The medium area (see head length chart below)	Less than 5.5 inches	Use the medium helmet.
	5.5 inches or more	Select size from head breadth chart below.
The large area (see head length chart below)	Less than 5.5 inches	Use the large helmet.
	5.89 inches or more	Use the large helmet with an XXLG liner.

Use the head length-sizing chart below to determine helmet size by length.

Helmet Size	Head Length (Inches)			
Small	6.6 – 7.3			
Medium		7.4 – 7.8		
Large			7.9 – 8.42	
Large (w/XXLG liner)				8.43 – 8.68

If required, use the head breadth-sizing chart below to determine helmet size.

Continued next page

D.3. Sizing Measurement Procedures (Continued)

If required, use the head breadth-sizing chart below to determine helmet size.

If head breadth is:	**Then use:**
5.0 – 6.2	Head length
6.3 – 7.0 +	Next larger size

NOTE

For those personnel that can't fit into a SPH-5CG helmet modified with the XXL energy absorbing liner, contact ALSE Tech. Services at ARSC.

Continued next page

D.4. Helmet Fit Check

After appropriate helmet size has been determined, crewmember must don helmet to check fit, comfort, and earcup position. Proper positioning and alignment of earcups is critical to helmet performance. Perform helmet fit check as follows:

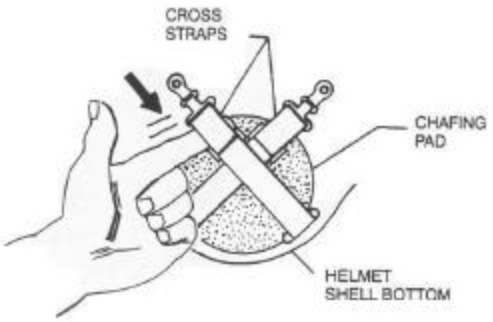
Step	Action
1	Don helmet in accordance with Encl. 4, section B.1.
2	Adjust chinstrap, nape-strap, and earcups to the as worn position. Earcups should be centered around the ears with a comfortable pressure felt fully around each ear, resulting in a uniform earseal compression. The earcups can be rotated within the retention assembly to assist in earcup centering. The helmet should fit snugly and comfortably on the head and should not move freely during head movement.
3	At this point, one or more of the following conditions will likely be present: Condition 1. Earcups are centered around the ears, but not adequately. Condition 2. Earcup compression is adequate, but earcups are not centered. Condition 3. Earcups are centered and compressed, but helmet fit is too tight. Condition 4. Earcups are centered and compressed, and helmet fit is satisfactory.
4	The paragraphs listed after the conditions contain procedures for correcting that condition. Find the condition(s) that relates to your helmet fit, and perform the procedures to correct any or all problems.

Continued next page

D.5. Correcting the Lack of Earcup Compression

A lack of earcup compression can be corrected by cross strap adjustment and/or spacer pad installation. Increasing the tension of the cross straps, which are located in the helmet shell behind the earcups, can improve the earcup compression and should be tried first. Adjust the cross straps as follows:

Step	Action
1	Insert a finger into the loop in each cross strap and slide the buckle toward the bottom of the helmet shell (see figure Encl. 4-9). Sliding the buckle in this direction tightens the strap and increases pressure on the earcup. The amount of compression required will determine the amount that the buckle is moved. Repeat this procedure for all four cross-straps and have crewmember don helmet and check fit.
2	If the compression is now sufficient, no further adjustments are necessary. If the straps have been fully tensioned and the compression is still not adequate, spaced pad installation is required.
3	An earcup spacer pad set is supplied with each helmet and consists of two ¼-in. thick pads, two ½in. thick pads, and two pieces of pressure sensitive pile material. The pile material must be attached to the outside of the earcup prior to spacer pad installation. The pile material is installed by peeling the paper from the pad and pressing the pad onto the center of the earcup.
4	Attach a ¼-in. thick pad to the pile material on each earcup and have crewmember don helmet and check fit.
5	If compression is still not adequate, remove helmet and continue adding spacer pads until satisfactory earcup compression is obtained. Spacer pads may be cut in any size or shape necessary to achieve a uniform, comfortable fit.



Encl. 4-9 Cross Strap Attachment

Continued next page

D.6. Earcup Centering

If the earcup compression is satisfactory but the ears are not centered in the earcups and cannot be centered by earcup rotation, perform the following procedure:

Step	Action
1	Remove TPL from helmet and have crewmember don helmet. Have crewmember hold helmet so that front edge of helmet is approximately ¾in. above eyebrows. With helmet in this position, check location of earcups, have crewmember remove helmet and proceed with TPL custom fitting procedures. Custom fitting of TPL should enable helmet and earcups to fit properly.
2	If earcups still can not be centered on the ears or the helmet must be moved too high or too low on head to allow proper earcup positioning, adjustment of retention assembly is required.
3	Adjustment of retention assembly straps requires removal of at least one earcup, TPL, and energy absorbing liner. Remove these components in accordance with Encl. 4, sections F.1 and F.4.
4	After component removal, refer to table below which shows factory settings of retention assembly straps. The front and center straps on each side raise and lower the earcups, while rear straps adjust forward and aft earcup positioning. The retention assembly straps each contain three holes. The top strap hole (hole nearest end of strap) is referred to as hole #1, the middle hole as #2, and the lowest hole as #3. Adjust straps as required, replace compounds, and have crewmember don helmet and check fit.

Helmet Size	Front Strap & Setting	Center Strap & Setting	Rear Strap & Setting
Small	#2	#2	#2
Medium	#2	#2	#2
Large	#1	#1	#1

Continued next page

D.7. Helmet Fit Tight

If the earcup fit is satisfactory but the helmet fit is too tight, proceed to the TPL Custom Fitting Procedure.

D.8. Helmet Fit Satisfactory

If the earcup compression is sufficient, the earcups are centered and the helmet fit is satisfactory, no further adjustments are necessary. The crewmember may remove the helmet and store it as required.

D.9. TPL Custom Fitting Procedure

To custom fit a TPL proceed as follows:

Equipment Required:

- Oven - capable of sustained temperature of 200°F (93.3 °C) with an internal volume of approximately 1.5 cubic feet
- Oven thermometer - self supporting and indicating between 190 °F (87.7 °C) and 210 °F (98.8 °C)
- Ruler
- Timer or equivalent
- Masking Tape

Step	Action	Result/Remarks
1	Preheat oven to 200 °F ± 5 °F (93.3 °C ± 2.8 °C).	• Ensure oven stabilizes at approximately 200 °F. • Review steps 5 through 10 so they may be completed in 30 seconds or less.
2	Place TPL in preheated oven, fabric side on the rack. **CAUTION** *Ensure that upper burner element(s) does not activate during heating process or plastic layers will melt.*	• Do not remove TPL cover; heat TPL as a unit. • Set oven rack in lowest position and place TPL in center for even heating.

Continued next page

D.9. TPL Custom Fitting Procedure (Continued)

The following is the continuation of the TPL custom fitting procedures.

Step	Action	Result/Remarks
3	Allow oven to stabilize at temperature listed in step 1 before getting time sequence.	• In helmet, cover hook fasteners on rear of energy absorbing liner with masking tape to ease TPL positioning when put in helmet for custom fitting.
4	Heat TPL for approximately 10 minutes.	• Set timer, stopwatch, or equivalent. • Check oven thermometer every 3 to 5 minutes during the heating process and adjust oven controls if temperature falls outside the range of 200 °F ± 5 °F (93.3 °C ± 2.8 °C). • Describe procedure to crewmember being fit.
5	Remove TPL from oven. **WARNING** TPL plastic may be hot to the touch.	• Steps 5 through 10 should be completed in less than 30 seconds. • Touch only fabric part of TPL. • Gloves may be used for heat sensitive hands.
6	Place TPL in helmet.	• Squeeze sides of TPL together to install. • Label and holes in TPL toward front of helmet.
7	Align TPL to protrude approximately 1/4” past front edge of energy absorbing liner.	• Ensure TPL is symmetrically located from side to side in center of helmet. • Do not be concerned if TPL rear extends beyond Styrofoam at rear of helmet.

Continued next page

D.9. TPL Custom Fitting Procedure (Continued)

The following is the continuation of the TPL custom fitting procedures.

Step	Action	Result/Remarks
8	Position TPL crown into helmet.	• Do not deform hot, soft TPL by pressing too hard in any one area.
9	Crewmember hooks thumbs in earcups, spreads helmet slightly, and dons helmet. Place front of helmet against brow and rotate helmet rearward down onto head.	• To ensure TPL does not bunch up in rear during donning, hold rear of TPL against energy liner while crewmember dons helmet. • Helmet should now be in normally worn position.
10	Pull downward with hands on top of helmet until ears are centered in earcups.	• Hold downward pressure for 3 to 5minutes. • Ensure entire ear is surrounded by earcup. Pull helmet down further if required to properly position earcups. • Chinstrap may be fastened to hold helmet in position. • Ensure shell is centered comfortably on head, i.e.. shell centerline over nose. • Lower visor to check nose centering and clearance.
11	Check eyebrow to shell offset.	• Offset should be approximately ¾inch above the eyebrow to allow maximum field of view. • Offset should not exceed ¾inch.

Continued next page

D.9. TPL Custom Fitting Procedure (Continued)

The following is the continuation of the TPL custom fitting procedures.

Step	Action	Result/Remarks
12	Release pressure on top of head at end of 3 to 5 minutes and remove helmet.	• Remove tape from hook fasteners covered in step 3. • Reposition TPL in helmet. • Label and holes in TPL are toward front of helmet.
13	Don helmet.	• Adjust earcups, tighten nape and chinstraps.
14	Check fit.	• Check for hot spots (pressure points). If none exist and helmet fits properly, remove helmet and store as required. If the helmet does not fit properly, i.e., hot spots, pressure points, too tight, remove TPL from helmet and repeat fitting procedure.

D.10. TPL Adjustment

Preformed TPL sizes medium and large each contain four layers of plastic, while the size small TPL contains six. The two extra layers in the size small TPL are included to allow proper fitting of the smallest head sizes. In some instances, it will be necessary to remove inner layers of plastic from a TPL during the helmet fitting process to ensure a proper fit. Removal of layers from the size small TPL may be necessary because while six layers are needed to fit the smallest head sizes, most small sizes may find six layers to be too tight for a comfortable fit. Removal of layers from the sizes medium and large becomes an option when the maximum head dimensions in Encl. 4, section D.3 are approached or exceeded.

Continued next page

D.10. TPL Adjustment (Continued)

If removal of layers is required, perform the procedure as follows:

CAUTION

When removing inner layers of plastic from a TPL, never remove more than two layers from any size TPL. As a minimum, the size small should have at least two layers each.

Step	Action
1	Remove TPL cloth cover and peel and discard inner layer(s) as required.
2	Replace cloth cover and check fit. If the helmet fits properly, no further adjustments are required. If the helmet fit is too tight or hot spots are present, repeat the TPL custom fitting procedure.

Section E. SPH-5CG Helmet Inspections

E.1. Inspections

Inspections consist of preflight and postflight inspections by the crewmember and periodic inspections by the Aviation Survival Technician.

E.2. Preflight Inspection

Prior to each flight, the crewmember should inspect the helmet assembly to see that it is in good working condition. The inspection should ensure that:

Step	Action
1	Helmet, liners, and earcup assemblies are properly fit.
2	Chin strap and nape strap are properly adjusted and retention assembly is attached to helmet with screws securely tightened.
3	Visors are clean, free from scratches, and operate properly.
4	All communication components are properly installed and earphones and microphone operate properly when tested.
5	All attaching hardware is securely tightened.

E.3. Postflight Inspection

After each flight, the crewmember should inform the AST of any component malfunction or damage to the helmet resulting from operational use. The AST shall repair or replace affected components in accordance with Encl. 4, section E.4.

Continued next page

E.4. Periodic Inspection

Crewmembers shall be responsible for ensuring that their helmet assembly has been inspected, cleaned, or replaced as necessary by the technicians. Periodic or scheduled inspections should occur every 180 days or as required. Perform periodic inspections in accordance with the inspection table provided below.

Component	Inspect for…	Deposition/Action
Helmet Shell	• Cracks, holes, warping • Cleanliness	• Replace shell • Clean IAW Encl. 4, section E.5
Energy Absorbing Liner	• Worn or loose hook fasteners • Gouges, large cracks, indents	• Replace fasteners • Replace IAW Encl. 4, section F.1
TPL	• Damaged areas, tears • Loose bond at edges, worn or loose cover • Cleanliness	• Replace IAW Encl. 4, section F.1 • Replace tape or cover • Clean IAW Encl. 4, section E.5
Earcup Assembly	• Cracked cup, torn earseal, worn earphone pad or spacer pads • Failed earphone • Cleanliness	• Replace IAW Encl. 4, section F.4 • Replace IAW Encl. 4, section F.4 • Clean IAW Section E.5
Retention Assembly	• Frayed or torn fabric, loose stitching, corroded or bent buckles • Cleanliness	• Replace IAW Encl. 4, section F.3 • Clean IAW Encl. 4, section E.5
Hardware	• Loose or missing	• Tighten or replace

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E.4. Periodic Inspection (Continued)

The following is the continuation of the periodic inspection.

Component	Inspect for…	Deposition/Action
Cord/ Connectors	• Cuts or cracks, deteriorated insulation or general damage • Cleanliness	• Replace or repair IAW Encl. 4, section F.6 • Clean IAW Section E.5
Visors	• Cracks or scratches, loose knobs • Cleanliness	• Replace or repair IAW Encl. 4, section F.2 • Clean IAW Encl. 4, section E.5
Visor Housing	• Cracks or damage to NVG mount • Cleanliness	• Replace IAW Encl. 4, section F.2 • Clean IAW Encl. 4, section E.5
Microphone, Swivel Assembly, Boom	• Failed microphone • Damaged or worn swivel boom	• Replace IAW Encl. 4, section F.5 • Replace IAW Encl. 4, section F.5

E.5. Cleaning the SPH-5CG Helmet

Components of the SPH-5CG helmet assembly can be cleaned if necessary. Procedures and equipment required to clean specified components are provided in the table below.

Component	Condition	Cleaning Method
Helmet Shell	Dirt, grease, scuff marks	Mild detergent and clean cloth; use Naphtha for worst stains.
Earcups	Dirt, perspiration	Wipe with damp cloth; do not use excessive water to ensure earphone protection.

Continued next page

E.5. Cleaning the SPH-5CG Helmet (Continued)

The following is the continuation of the SPH-5CG cleaning procedures.

Component	Condition	Cleaning Method
Cord Assembly, Connector	Dirt, grease	Wipe with damp cloth.
Visors	Dust, grease, perspiration	Soft cloth and mild soap solution; rinse with clean water.
Visor Housing, Track, Knob	Sediment, dirt build-up, grease	Clean cloth dampened with mild detergent solution.
Retention Assembly	Dirt, grease	Clean cloth dampened with water. Allow to dry thoroughly.
TPL Cloth Cover	Dirt, stains	Machine-wash (gentle cycle) or hand-wash with warm water and let dry. **NOTE** It is recommended the two-sided tape be replaced after each washing.
TPL Layers	Dirt	Hand-wash, soap and water only.

Section F. Component Removal and Replacement

F.1. Energy Absorbing Liner and TPL

Remove and replace energy absorbing liner and TPL as follows:

Step	Action
1	Squeeze sides of TPL together and remove from helmet.
2	Remove earcups from retention assembly in accordance with Encl. 4, section F.4, steps 1 through 3**,** and allow earcups to hang on outside of helmet.
3	Insert a flat-tip screwdriver or tongue depressor between energy absorbing liner and helmet shell and disengage hook and pile fastener material holding liner in place.
4	Apply a slight amount of pressure on liner from rear and slide liner out front of helmet.
5	**NOTE** Ensure replacement liner has attachment tabs (hook fastener material) in place prior to installation of liner in helmet. Install replacement liner by inserting rear of liner in front of helmet and applying slight pressure to position liner in helmet. Position liner to engage hook and pile tabs.
6	Squeeze sides of TPL together and attach to energy absorbing liner in helmet.
7	Reinstall earcups IAW Encl. 4, section F.4, steps 10 and 11.

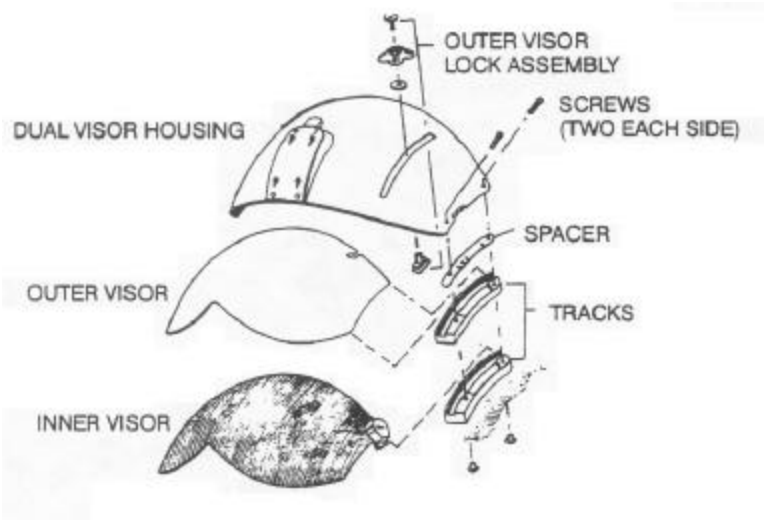
Continued next page

F.2. Dual Visor Assembly

Remove and replace dual visor assembly as follows:

NOTE

The dual visor assembly is held together and attached to the helmet with four screws; two on each side. Removal of these screws allows any or all of the components (visors, tracks, housing, etc.) to be replaced (see figure Encl. 4-10).



Encl. 4-10 Dual Visor Assembly

Step	Action
1	Remove four screws (two screws each side) from dual visor assembly and carefully remove assembly from helmet. **NOTE** Prior to disassembling the dual visor assembly, note the order and alignment of the components to ensure proper assembly (see figure Encl. 4-10).
2	Lift visor housing off assembly to expose spacers, tracks, and visors.
3	Replace visor or housing as required and assemble components for installation.
4	Place assembly on helmet and attach using four screws removed in step 1. Tighten screws securely, but do not over-tighten.

Continued next page

F.3. Retention Assembly

Remove and replace retention assembly as follows:

Step	Action
1	Remove earcups from retention assembly IAW Encl. 4, section F.4, steps 1 through 3, and allow earcups to hang by cord on outside of helmet.
2	Remove energy absorbing liner and TPL IAW Encl. 4, section F.1, steps 1 through 4.
3	**NOTE** Prior to removing attaching hardware from retention straps, note which strap holes are used for attachment. These same holes must be used when installing new retention assembly. The front and center straps on both sides share attaching hardware with a helmet shell cross strap. The left rear strap shares hardware with the communication cord strain relief points, note position and order of attachment to ensure correct installation (see figure Encl. 4-11). Remove six screws (three each side), washers, and posts attaching retention assembly to helmet shell and remove retention assembly from helmet.
4	Align replacement retention assembly straps in position in helmet and install using hardware removed in step 3. Insert screws through holes previously used and tighten securely, but do not overtighten.
5	Install energy absorbing liner and TPL IAW Encl. 4, section F.1, steps 5 and 6.
6	Install earcups IAW Encl. 4, section F.4, steps 10 and 11.

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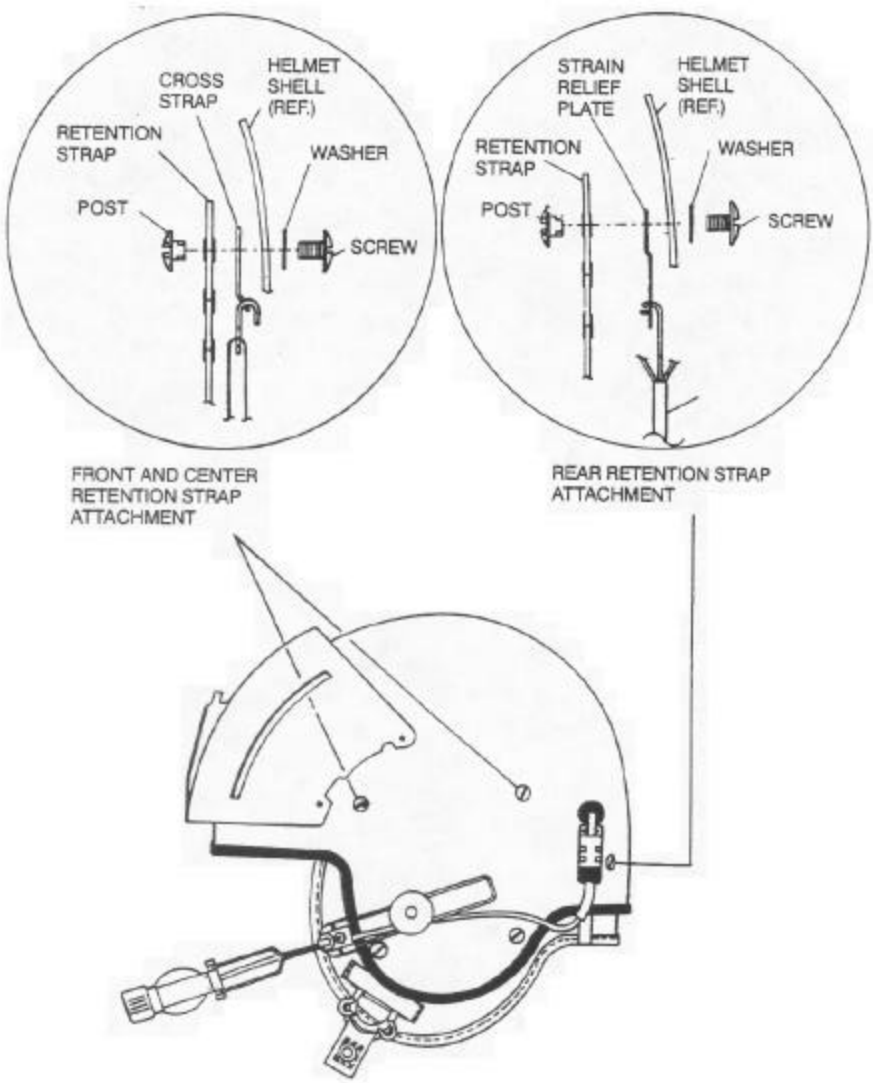
F.3. Retention Assembly (Continued)



Encl. 4-11 Retention Assembly Attachment

Continued next page

F.4. Earcups and Earphones

Remove and replace earcups and earphones as follows:

NOTE

Replacement of the earphone does not require earcup removal. If replacing earphone only, perform steps 4, 5, 7, 8, and 9.

Step	Action
1	Pull earcup toward middle of helmet away from cross straps; pull retention back towards shell to expose raised tabs on earcup edge.
2	Working from middle of helmet, insert a small, flat-tip screwdriver between earcup and earcup loop of retention assembly.
3	Work screwdriver carefully around edge of earcup and lift retention assembly over earcup tabs until earcup can be pulled in to middle of helmet.
4	Remove earseal from earcup and pull earphone holder and earphone out of earcup.
5	Pull earphone out of earphone holder and remove cord leads from earphone using a jewelers screwdriver or allen wrench as required.
6	Pull communication cord and grommet out of earcup.
7	Insert communication cord and grommet into replacement earcup. Attach communication cord leads to replacement earphone using a jewelers screwdriver or allen wrench as required.
8	Insert earphone into earphone holder and insert both into earcup.
9	Replace earseal on earcup and tape over earseal.
10	Position earcup into retention assembly so that retention is between raised tabs on earcup.
11	Insert screwdriver from outside retention assembly and lift retention over tabs on earcup.
12	Repeat procedure for other earcup as required.

Continued next page

F.5. Microphone

The microphone, microphone cord, boom, and swivel are replaced as one assembly. Remove and replace as follows:

Step	Action
1	Unplug microphone cord from connector at rear of helmet.
2	Turn swivel in a counterclockwise direction until microphone, swivel assembly, boom, and microphone cord can be lifted up and off of helmet.
3	Slide replacement microphone, boom, and swivel assembly into bracket on helmet and hand-tighten swivel knob until secure.
4	Insert microphone cord connector into plug on rear of helmet.

F.6. Communications Cord

Remove and replace communications cord as follows:

Step	Action
1	Unplug microphone cord from connector at rear of helmet.
2	Cut shrink tubing off connector using a razor blade or knife.
3	Remove connector from bracket and remove two screws securing bracket and mounting plate to helmet shell.
4	Remove TPL and energy absorbing liner IAW Encl. 4, section F.1 steps 1 and 2.
5	Remove screw, washer, and post securing rear retention strap and cord strain relief from left rear of helmet (see figure Encl. 4-11).
6	Remove earphone IAW Encl. 4, section F.4, steps 4, 5, and 6.
7	Pull grommet out of helmet shell and pull communications cord out of helmet.
8	Insert replacement cord through grommet hole in shell and attach grommet to helmet shell.

Continued next page

F.6. Communications Cord (Continued)

The following is the continuation of the communications cord removal and replacement procedures.

Step	Action
9	Secure cord in strain relief and attach strain relief and retention strap to helmet shell using screw, washer, and post removed in step 5.
10	Feed cord through earcups and attach grommet to earcup.
11	Attach cord leads to earphone, insert earphone into earphone holder, and place both in earcup.
12	Secure connector bracket and mounting plate to helmet shell using screws removed in step 3, and insert connector into bracket.
13	Install shrink tubing to connector IAW Encl. 4, section F.7.
14	Install energy absorbing liner and TPL IAW Encl. 4, section F.1, steps 5 and 6.
15	Insert microphone cord plug into connector.

F.7. Shrink Tubing Installation

To install shrink tubing proceed as follows:

Step	Action
1	Cut a ¾to 1-inch length of shrink tubing.
2	Slide tubing over connector and bracket.
3	Heat tubing using heat gun being careful not to overheat any one area.
4	Remove heat as tubing shrinks to shape of connector.
5	Trim ends of tubing as flush as possible with ends of connector and bracket using a razor blade or small scissors.

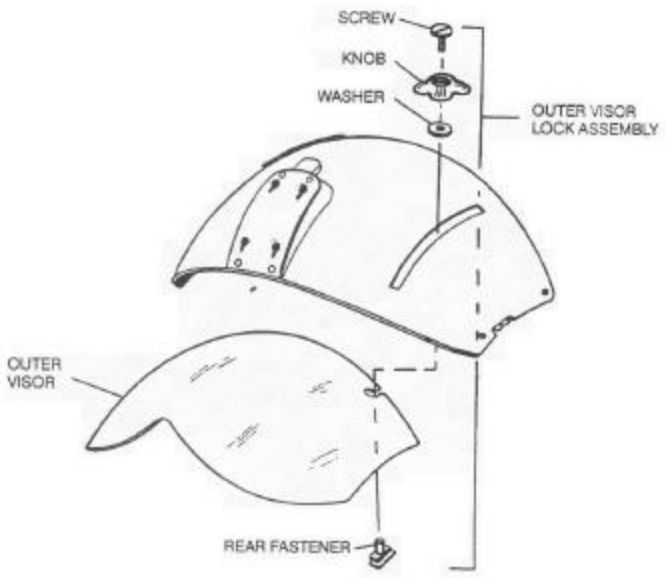
Continued next page

F.8. Visor Adjustment

Visor adjustment consists of changing the outer visor control knob from the left side to the right side to allow right hand operation. This procedure does not require removal of the visor or the visor housing.

F.9. Outer Visor Control Knob

Remove and replace outer visor control knobs as follows:



Encl. 4-12 Outer Visor Adjustment

Step	Action
1	Lower inner neutral visor by pulling down on knob to prevent scratching or damaging this visor while performing adjustment.
2	Using a flat-tip screwdriver, loosen and remove (left-hand thread) screw in center of outer visor control knob. Knob will detach from visor, along with a washer and a rear fastener. Rear fastener is located beneath visor (see figure Encl. 4-12).
3	Position rear fastener beneath visor in right side housing slot and place washer and knob over top of rear fastener post.
4	Insert screw removed in step 2 and tighten until secure, but do not overtighten.
5	Lower and raise visor to ensure operation is correct.

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Section G. Illustrated Parts Breakdown

G.1. Illustrated Parts Breakdown

The illustrated parts breakdown (IPB) consists of an illustration and a parts list. The illustration, complete with numbered call-outs, is shown first. The parts list follows with columns for reference numbers, part numbers, description, quantity required, and usable on codes. Each of these columns is described in the following sections.

G.2. Reference Number

The reference number column contains a figure number in the first position to identify which illustration is being referenced. This column also contains numbers, which correspond to call-outs on the figure being referenced. These numbers help ensure positive identification of a particular part.

G.3. Part Number and Description

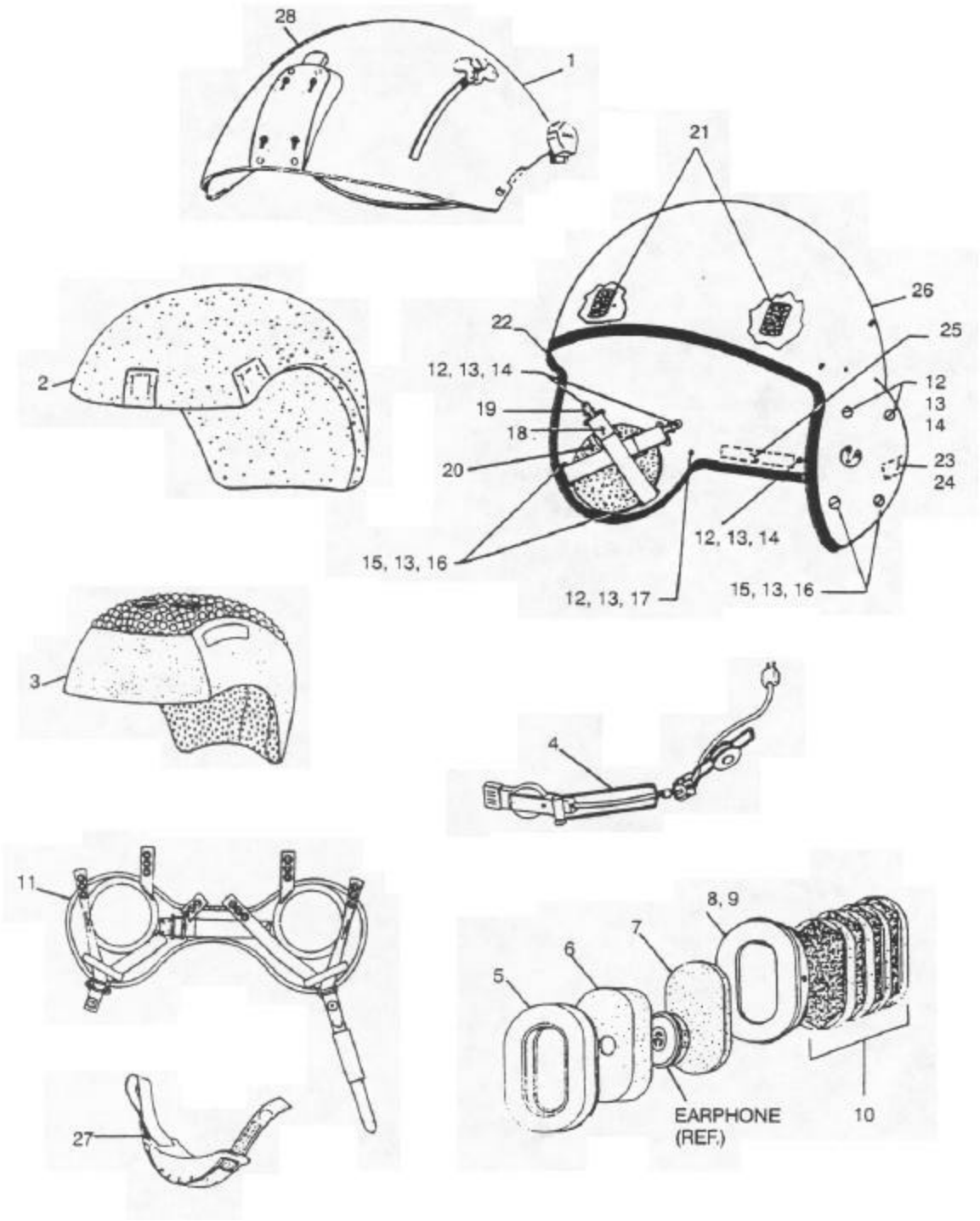
The part number and description columns are used to identify the parts. The part number column lists the assigned part number for a particular part. The description column contains an indented description of the parts. The indenture is used to show relationship between the parts, assemblies, and subassemblies. Indenture is shown by a (.) in front of the description. Parts that belong to an assembly will be indented beneath that assembly.

G.4. Units Per Assembly (UPA)

This column reflects the quantity of a part needed by its next higher assembly. This quantity may not be the total quantity of this part used for the complete assembly. A REF (reference) in this column indicates that this part is the assembly which is being broken down in the parts list, and is the assembly shown in the referenced figure.

G.5. Usable On Code (UOC)

This column reflects codes assigned to each size of the helmet assembly. Code A is used to represent the size small helmet, code B represents the size medium helmet, and code C represents the size large element.



Encl. 4-13 SPH-5CG Helmet Assembly

Continued next page

FIG.	Part Number	Description	UPA	UOC
13	90D7982-1	SPH-5CG HELMET ASSEMBLY, SMALL	REF	A
	90D7982-2	SPH-5CG HELMET ASSEMBLY, MEDIUM	REF	B
	90D7982-3	SPH-5CG HELMET ASSEMBLY, LARGE	REF	C
1	90C8019-1	DUAL VISOR ASSEMBLY (SEE FIGURE ENCL. 4-14 FOR BREAKDOWN)	1	ABC
2	90D8014-1	ENERGY ABSORBING LINER, SMALL	1	A
	85D7286-2	ENERGY ABSORBING LINER, MEDIUM	1	B
	85D7211-2	ENERGY ABSORBING LINER, LARGE	1	C
	91D8203-1	ENERGY ABSORBING LINER, XX-LARGE	A/R	C
3	85D7087-31	TPL, SMALL (SEE FIGURE ENCL. 4-15 FOR BREAK DOWN)	1	A
	85D7087-4	TPL, MEDIUM (SEE FIGURE ENCL. 4-15 FOR BREAK DOWN)	1	B
	85D7087-5	TPL, LARGE (SEE FIGURE ENCL. 4-15 FOR BREAK DOWN)	1	C
4	306A38	COMMUNICATIONS ASSEMBLY (SEE FIGURE 16 FOR BREAKDOWN)	1	ABC
5	88C7589	EARSEAL	2	ABC
6	83C6573	CUSHION, EARCUP INSERT	2	ABC
7	83B6572-5	PAD, FILLER	2	ABC
8	85C7135-4	EARCUP, LEFT	1	ABC
9	85C7135-5	EARCUP, RIGHT	1	ABC

Continued next page

FIG.	Part Number	Description	UPA	UOC
13				
10	79B2302	SET, SPACER PAD	1	ABC
11	90D8018-2	RETENTION ASSEMBLY (SEE FIGURE ENCL. 4-17 FOR BREAKDOWN)	1	ABC
12	75A3093-9	SCREW, 8-32 x 1/4	6	ABC
13	76A3443	WASHER, SPRING	10	ABC
14	69A2104-3	POST, 3/16	5	ABC
15	75A3093-5	SCREW, 8-32 x 3/16	4	ABC
16	69A2104-1	POST, 1/16	4	ABC
17	69A2104-2	POST, 1/8	1	ABC
18	67B1732-1	CROSS STRAP (SHOWN INSTALLED)	4	ABC
19	69A2118	ADAPTER (SHOWN INSTALLED)	4	ABC
20	67A1777	PAD, CHAFING	2	ABC
21	85A7256-20	FASTENER, PILE	2	ABC
22	63A1088	BEADING, EDGE	1	ABC
23	70788	LABEL	1	ABC
24	78A4131-1	NAMEPLATE, CHROME	1	ABC
25	91A8061	DECAL, US COAST GUARD	1	ABC
26	90D7983-1	HELMET SHELL, SMALL/MEDIUM	1	AB
	90D7894-1	HELMET SHELL, LARGE	1	C

Continued next page

FIG.	Part Number	Description	UPA	UOC
13				
27	90C8047	CHIN STRAP (OPTIONAL)	1	ABC
28	90B7951-2	FASTENER, PILE, ANVIS CABLE ATTACHMENT	1	ABC
29	90A7946-6	KIT, ANVIS MOUNTING (NOT SHOWN)	1	ABC
30	90B7951-1	FASTENER, PILE, ANVIS POWER PACK (NOT SHOWN)	1	ABC

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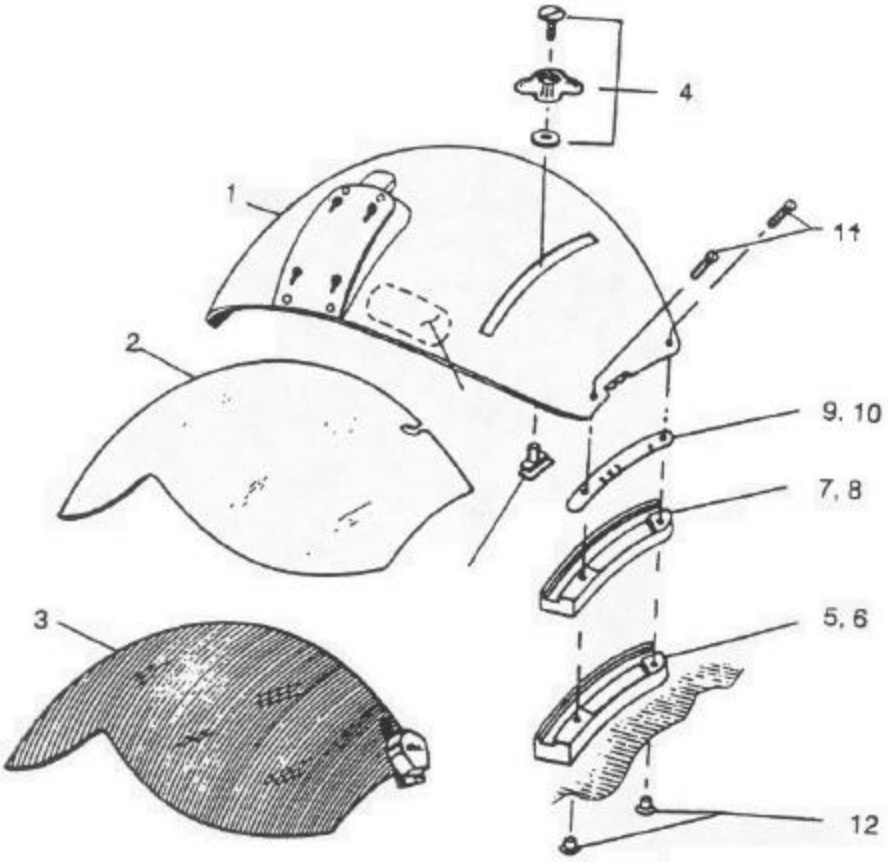

Encl. 4-14 Dual Visor Assembly

FIG.	Part Number	Description	UPA	UOC
14	90C8019-1	DUAL VISOR ASSEMBLY	REF	ABC
1	90C8000-1	HOUSING ASSEMBLY, ANVIS	1	ABC
2	D7933-3	OUTER LENS, CLEAR	1	ABC
3	D7932-2	INNER LENS, NEUTRAL	1	ABC
4	74A2857-1	LOCK ASSEMBLY, VISOR	1	ABC

Continued next page

FIG.	Part Number	Description	UPA	UOC
14				
5	90D7934-1	TRACK, LOWER, LEFT-HAND	1	ABC
6	90D7934-2	TRACK, LOWER, RIGHT-HAND	1	ABC
7	90C7935-1	TRACK, UPPER, LEFT-HAND	1	ABC
8	90C7935-2	TRACK, UPPER, RIGHT-HAND	1	ABC
9	90C8029-1	SPACER, DETENT, LEFT-HAND	1	ABC
10	90C8029-2	SPACER, DETENT, RIGHT-HAND	1	ABC
11	75A3096-49	SCREW, BIND HEAD	4	ABC
12	69A2094	POST, 5-40	4	ABC
NS	82A5653-1	LENS GUARD, MOLESKIN	6	ABC

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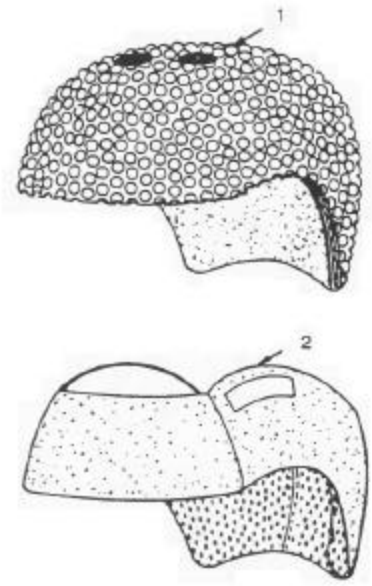

Encl. 4-15 TPL Assembly

FIG.	Part Number	Description	UPA	UOC
15	85D7087-31	TPL, SMALL	REF	A
	85D7087-4	TPL, MEDIUM	REF	B
	85D7087-5	TPL, LARGE	REF	C
1	85C7257-5	LAYER ASSEMBLY	1	A
	85C7257-1	LAYER ASSEMBLY	1	B
	85C7257-2	LAYER ASSEMBLY	1	C
2	85D7088-31	COVER	1	A
	85D7088-4	COVER	1	B
	85D7088-5	COVER	1	C

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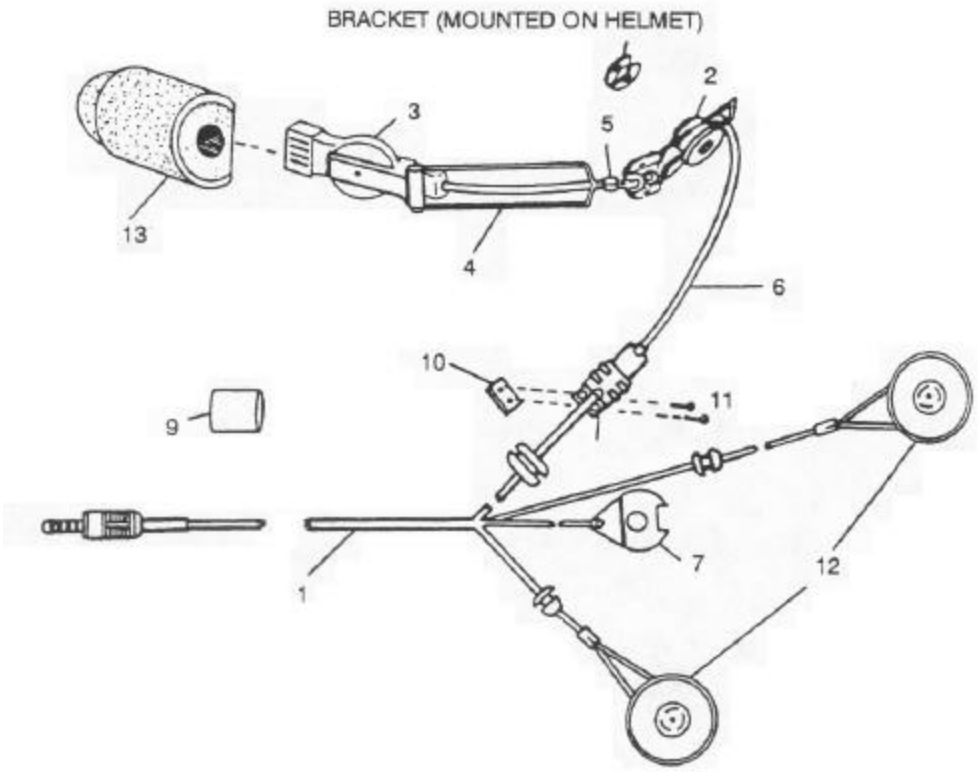

Encl. 4-16 Communications Assembly

FIG.	Part Number	Description	UPA	UOC
16	306A38	COMMUNICATIONS ASSEMBLY	REF	ABC
1	75C3523-1	CORD, COMMUNICATIONS	1	ABC
2	90A8017	SWIVEL ASSEMBLY	1	ABC
3	78A4046-1	MICROPHONE	1	ABC
4	71B2285	BOOM	1	ABC

Continued next page

FIG.	Part Number	Description	UPA	UOC
16				
5	69A2136	CLIP	1	ABC
6	69C2080	CORD, MICROPHONE	1	ABC
7	69A2060	PLATE, STRAIN RELIEF	1	ABC
8	69B2035	HOLDER, JACK (Not Shown)	1	ABC
9	69B2045-9	TUBING, SHRINK	A/R	ABC
10	69A2037-2	PLATE	1	ABC
11	69A2036	SCREW	1	ABC
12	73B2619	EARPHONE	1	ABC
13	87A7488	WINDSCREEN	1	ABC

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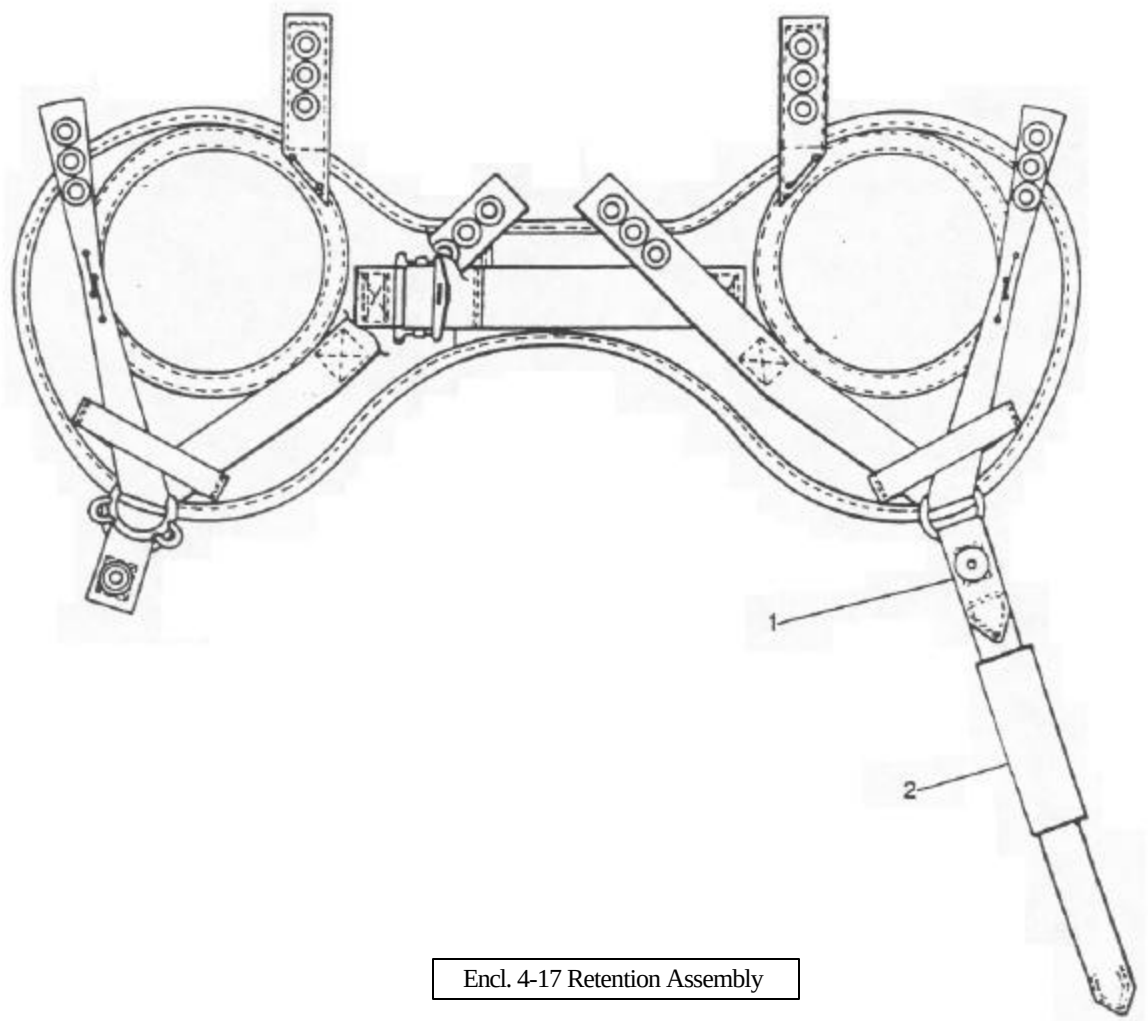

Encl. 4-17 Retention Assembly

FIG.	Part Number	Description	UPA	UOC
17	90D8018-2	RETENTION ASSEMBLY	REF	ABC
1	90D7977-7	CHIN STRAP	REF	ABC
2	90C7952-2	CHIN PAD	REF	ABC

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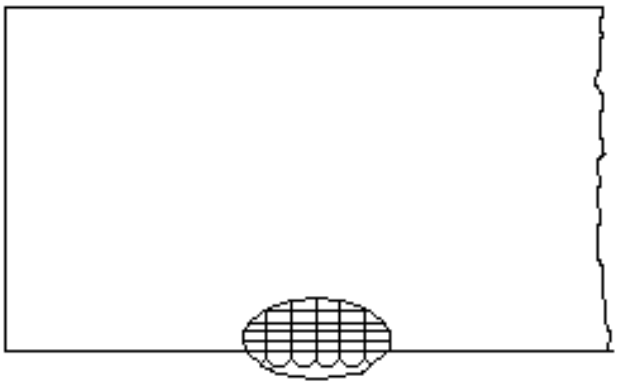
Section A. Fabric

A.1. Fabric Introduction

In the manufacture of textile fibers and materials, certain terms are used which are standard throughout the industry. The terms and how they will be applied are discussed below.

A.2. Selvage Edge

The *selvage edge* is the edge of cloth tape, webbing, or fabric and is woven in such a way as to prevent unraveling. The selvage edges are used as a guide to find the *warp* and *filler threads*, for marking the reference line, and for locating *bias*.



A.3. Warp Threads

Warp threads are threads that run parallel to the selvage edge. The warp threads form the framework for the material and support most of the strain during the weaving process.

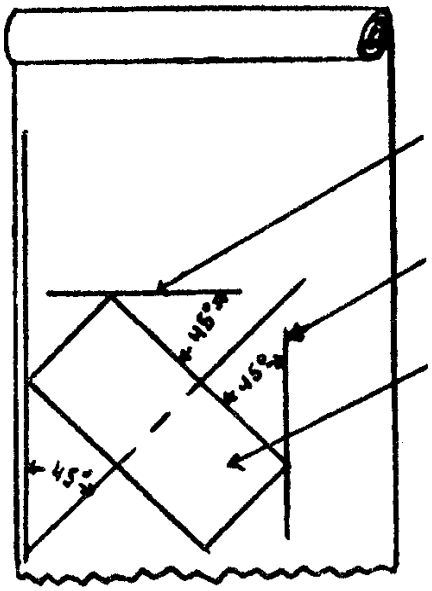
A.4. Filler Threads

Filler threads are threads that run perpendicular to the warp threads and selvage edge.

Continued next page

A.5. Bias

Seams made on the 45° angle to the filler threads, warp threads and the selvage edge are said to be made on the *bias*. Bias construction will provide more elasticity and strength, and will reduce the effect tears have on the integrity of the material.



Section B. Fabric Layout

B.1. Measuring Material

Always lay out material on a clean, smooth surface and ensure the material is wrinkle free before marking or cutting.

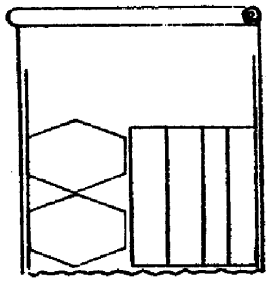
While measuring, always work from a reference line. The reference line is made parallel to the selvage edge of the material. In most cases you will cut away the selvage edge, this will prevent uneven stretching while sewing.

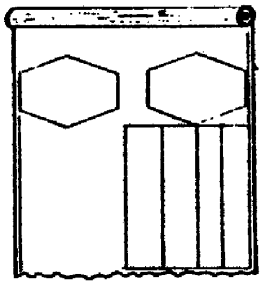
Measure and mark all pieces to be cut using actual dimensions, including all seam allowances. When measuring use a yardstick, ruler or carpenters square.

Mark the material using contrasting colored pencil or tailors chalk. DO NOT USE INK.

B.2. Pattern Layout

When placing your pattern, place it to minimize the amount of material being used. In the illustration on the left the pattern is laid out with little or no waste, while the one on the right wastes material.





B.3. Material Cutting

Whenever you cut material from a roll, always cut from selvage edge to selvage edge, place all serviceable waste into the scrap box.

B.4. Tolerance

When measuring material during fabric layout, it is important to know how accurate to measure. The tolerance of a measure is the allowable deviation a measurement can have from the actual measurement. It is expressed as a + (plus) or - (minus) sign, followed by the tolerance measurement. Let 10 be the measurement and let ¼ be the tolerance, this will be written as 10 +-¼. This means the preferred measurement is 10, but 9¾ to 10¼ are also acceptable.

Continued next page

B.5. Symbols

There are many symbols used in the fabric shop. The first symbols are those used for feet (') and inches ("). The proper way to write a measurement using these symbols is, for example, 15 ' 4", which means 15 feet 4 inches.

Pi (pronounced pie) is represented by the symbol π. The value of π is 3.1416, but for work in the fabric shop 3.14 is close enough.

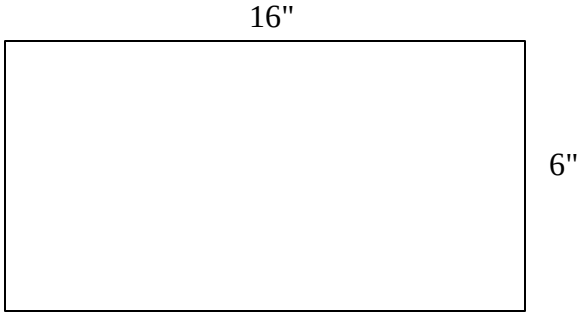
π is not just another number; it is used in formulas to find the area and circumference of a circle.

Another mathematical symbol you will use is the symbol for the number squared. If you think of r as the number to be squared, then r squared would be written as r^2. This means that r is multiplied by itself, or $r \times r = r^2$.

B.6. Area

Area is the surface within a set of lines. All area measurements are expressed in square units (square foot, square yard, etc.). There are two different formulas to remember when finding the area of either a rectangle or a circle.

To find the **a**rea of a rectangle you multiply the **l**ength by the **w**idth. The formula is A=LW or A= L x W. To find the area of the rectangle below substitute 16" for L and 6" for W.



A=16" x 6"
A=96 square inches

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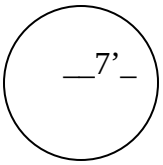
B.6. Area (Continued)

To find the area of a circle you multiply π (3.14) by the radius (the length of a line measured from the center of a circle to the edge) squared. The formula is $A=\pi r^2$ or $A= \pi \times r^2$. To find the area of the circle below substitute 3.14 for π and 7' for r.

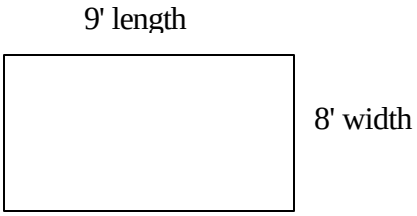
A=3.14 x $(7')^2$ or A= 3.14 x 49 square feet
A= 153.86 square feet



B.7. Perimeter

Perimeter is the distance around an object. This measurement is important in fabric layout because the perimeter of two pieces sewn together at the edges must be equal. Another often used term for perimeter is circumference, which is the distance around a circle. To find the perimeter of a rectangle, multiply the length times two and the width times two and then add the figures together. This would be written as P= L2 + W2 or P=(L x 2)+(W x 2). To find the perimeter of the rectangle below;

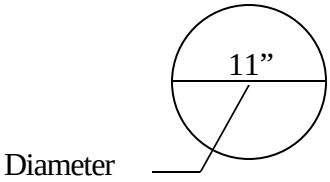
P= (9 x 2) + (8 x 2)
P= 18' + 16'
P= 34'



To find the circumference (perimeter) of a circle you multiply π times the diameter (a straight-line measurement from the edge of a circle through the center across to the other edge). The formula is $C= \pi D$ or C=3.14 x D. To find the circumference of the circle below;

C= 3.14 x 11”

C= 34.54”



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B.8. Patterns and Templates

Patterns and templates are used during fabric layout as a guide in drawing the outline of projects or parts of projects to be manufactured. Patterns and templates are made when multiple items, identical in both size and shape, are to be cut out. Either type saves time, and they can both be saved for future use. Patterns are made of fabric, paper or cardboard and are not as permanent as templates, which are made of wood, metal or plastic.

B.9. Alignment Marks

Patterns and templates usually have alignment marks, which are holes, notches, arrows, etc. These alignment marks are used to match the perimeters of two or more pieces of material to one another during sewing.

B.10. Pattern and Template Rules

The following rules should be observed when using patterns and templates:

- Make sure the correct side of the pattern or template is facing up.
- Do not move the pattern or template once you begin tracing. Any movement will misalign the marks and the project may not fit properly
- Make marks distinctly but lightly. Heavy markings can mar the appearance of an otherwise well-made item.
- Establish all alignment marks and recheck them before moving the pattern or template.
- Ensure the seam allowances have been made on the pattern or template.

Section C. Seams

C.1. Definition of Stitch, Seam and Stitching

The following definitions describe Seam, Stitch and Stitching.

Stitch: One unit of thread formation resulting from passing a thread through material at uniformly spaced intervals.

Seam: A joint consisting of a sequence of stitches uniting two or more plies of material.

Stitching: A sequence of stitches for finishing an edge, or for ornamental purposes, or both, in preparing parts for assembly. Machine seams or stitching has specific advantages over hand-sewn seams. Speed of fabrication appearance and uniformity of tension contribute to the characteristics of a good seam.

C.2. Seam Strength

Strength of a seam or stitching depend on the type of thread, strength, stitch type, number of stitches per inch, the construction and tightness of the seam, and the size and type of needle point used. The strength of the seam should equal that of the material it joins.

C.3. Seam Elasticity

Elasticity and flexibility of a seam depend on the stretching qualities of the material, the quality and tension of the thread, the length of the stitch, and the type of seam or stitch used.

C.4. Seam Durability

The wearing qualities of the material, the quality of the thread, and the tension of the stitch determine durability. The relation between the elasticity of the seam and the material will determine the durability.

C.5. Seam Security

The security of a seam or stitching depends chiefly on the stitching type and the ability to resist unraveling. The stitch must be well set in the material to prevent snagging which can cause breaking and possible unraveling. All seam ends should be backstitched or overstitched to prevent unraveling.

C.6. Seam Appearance

Seam appearance is largely controlled by their construction and neatness of workmanship; however, appearance should be secondary to any of the above factors.

Continued next page

C.7. Seam Classes

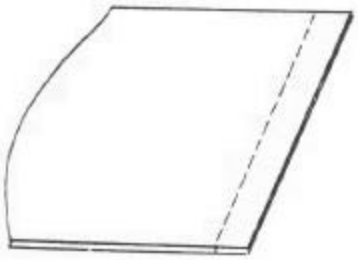
Seams are divided into four classes:

1. Superimposed Seam (SS)
2. Lap Seam (LS)
3. Binding Seam (BS)
4. Flat Seam (FS)

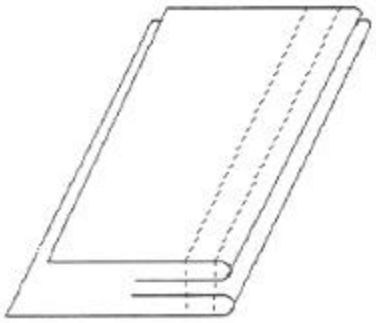
C.8. Superimposed Seam (SS)

The superimposed seam is formed by placing one ply of material on top of another (superimposed) and seaming with one or more rows of stitches. Two types of Superimposed seams are Ssa-1 and SSc-2

a. The SSa-1 seam is a simplified method of joining two or more pieces of material. The following example shows a Ssa-1 (one row of stitching).



b. The SSc-2 seam, as seen below, is formed by superimposing two plies of material, turning the edges of both plies a specific distance to the inside, and seaming through both turned edges a specified distance from the edges.



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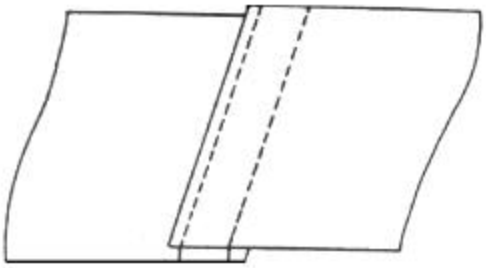
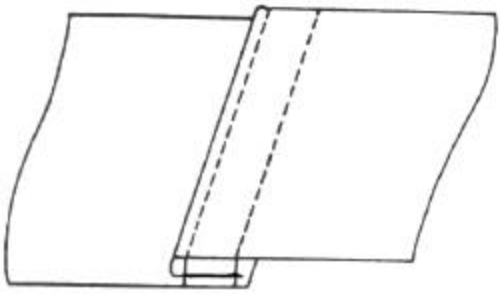
C.9. Lap Seam (LS)

The lap seam is formed by lapping the plies of material, and seaming with one or more rows of stitches. There are four types of lap seams.

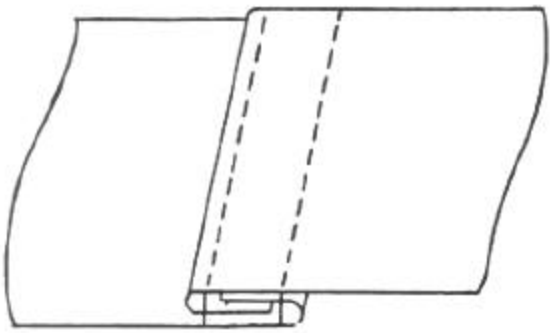
a. Overlapping two or more plies of material, and seaming with two or more rows of stitches as seen below forms the LSa-2.



b. Turning the edge of one ply of the material under itself and lapping it on top of another ply and seaming with two or more rows of stitches as seen below forms the LSb-2.



c. Turning the edges of both plies under and lapping them, then seaming with two rows of stitches as seen below forms the LSc-2.



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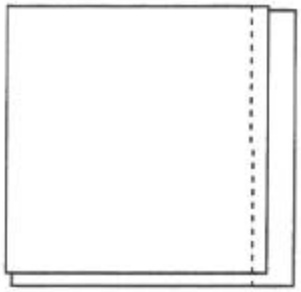
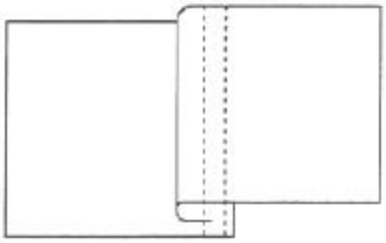
C.9. Lap Seam (LS) (Continued)

d. The LSd-2 seam, as seen below (step 2), is formed by placing one ply on top of another. The top is placed a specified distance from the edge to be sewed, then seamed with one row of stitches (step 1). Pull the top ply back over the stitch and seam with another row of stitches (step 2).



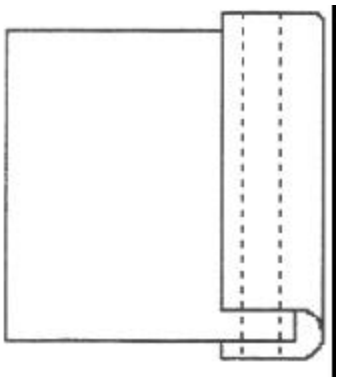
Step 1



Step 2

C.10. Binding Seam (BS)

The BSa-2 binding seam, show below, is formed by folding a binding strip over the edge of one or more plies of material and seaming the binding strip to the material with one or more rows of stitches.



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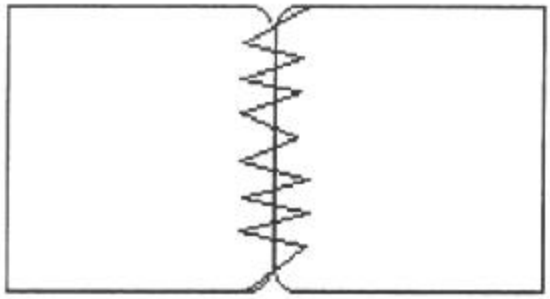
C.11. Flat Seam (FS)

The flat seam is formed by seaming the abutting edges of material together, as seen below, in such a manner that the stitches extend across and cover, or tend to cover, the edges of the plies of material joined.



Section D. Stitchings

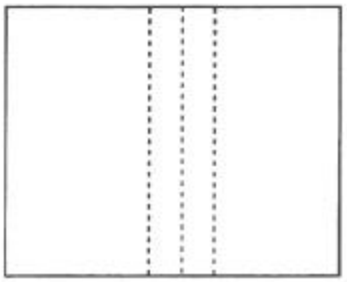
D.1. Seam Classes

Stitchings are divided into two classes:

1. Ornamental (OS)
2. Edge Finishing (EF)

D.2. Ornamental Stitching (OS)

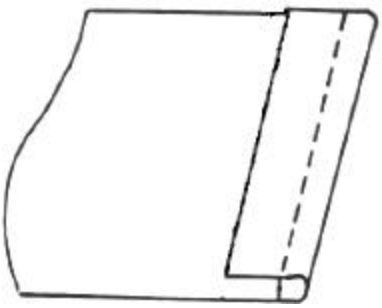
The ornamental stitching, like the OSa-3 below, is formed when a series of stitches are embodied in material, either in a straight line, a curve, or following a design for ornamental purposes.



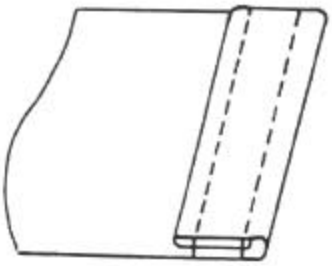
D.3. Edge Finishing (EF)

The edge finishing stitching is used to prevent the raw edges of the material from unraveling and can be sewn by one of three ways:

The EFa-1, EFb-2 has the edge of the material folded back one or more times and then sewn together with one or more stitches.



EFa-1



EFb-2

Section E. Seam Specifications and Classes

E.1. Seam Specification

Many fabrication patterns or repair procedures will provide a seam specification that is required to perform a task. Below is an example of how a seam specification may be expressed.

301-SSa-1

Stitch Class Row of Stitches

Class of Seam Type of Class

E.1.a. Stitch Classes

The stitch class, which is a three digit arabic numeral, is the first of four parts that are used to identify a seam or stitching.

E.1.b. Seam or Stitching Class

Next is the "seam or stitching class." This is indicated by two or more upper case letters.

E.1.c. Class Type

The third item in the seam specification is the "type of class." This is indicated by one or more arabic numerals.

E.1.d. Number of Rows of Stitches

The last specification is the "number of rows of stitches." This is indicated by two or more upper case letters.

Section F. Thread and Cord

F.1. Thread and Cord Introduction

Thread is used in the AST shop for safety tacking, sewing, attachment (securing) of equipment. This section will cover the common types of thread and cord used in these applications.

F.2. Thread

Normally AST shops will use MIL-T-7870, nylon "Z" twist type thread for the following reasons:

- The action of a sewing machine will twist the "Z" twist thread tighter.
- High strength and controllable elongation
- High abrasion resistance
- Excellent elastic recovery
- Excellent resistance to alkaline and many other chemicals.
- Resistance to attacks by mildew, fungus and other microorganisms.

Thread	Tensile Strength (Pounds minimum)
A	2.75
AA	3.9
B	5.5
E	8.5
F	11.0
FF	16.0

Continued next page

F.3. Size 3 and Size 6 Cord

Size 3 and size 6 cord are actually a nylon thread. They are commonly used in the manufacturing of parachute riser assemblies, safety belts and restraints. Both sizes are also used for tacking webbing.

Cord	Tensile Strength (Pounds minimum)
3	24
6	50

F.4. Type I and Type III Parachute Cord

Type I and Type III nylon parachute cords are of the "sheath and core" type parachute cord. The outer part of the cord is a woven "Sheath" that encases a "Core" of individual wound lines; together they make up the cord. Type I cord is used to tie survival items to life vests and life rafts. Type III is commonly referred to as "Suspension Line" because it is used to suspend the parachute canopy when it is deployed. Type I and Type III can also be used with its core lines removed for various projects in the fabric shop.

Cord	Tensile Strength (Pounds minimum)
Type I	100
Type III	550 (300 if gutted)

Section G. Webbing

G.1. Webbing

Nylon webbing is manufactured in many different sizes, widths, thickness, tensile strengths, and color identifications.

Type	Width (in.)	Tensile Strength (lbs.)	Color ID (if any)	Use
I	9/16	500	N/A	Container reinforcing
II	1 ± 1/32	600	N/A	Stowing band retainers
III	1-¼ inches	800	N/A	Sleeve bridles
IV	3 ±	1,800	N/A	Container extensions, reinforcing, buffers
VI	1-23/32 ± 1/16	2,500	Red center line	Container reinforcements chaffing strips
VII	1-23/32 ± 1/16	6,000	Yellow lines at each selvage	Harness webbing
VIII	1-23/32 ± 1/16	4,000	Black center line	Container reiforcement
IX	3 ± 3/32	9,000	N/A	Lap belts
XII	1-23/32 ± 1/16	1,200	Red lines at each selvage	Chaffing strips
XIII	1-23/32 ± 3/32	7,000	Black lines at each selvage	Harness webbing
XIX	1-¾± 3/32	10,000	Green line at center	Cargo tie-down

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G.2. Tubular Webbing

Nylon tubular webbing is manufactured in many different sizes, widths, thickness, tensile strengths, and identification markings.

Width (in.) ± 1/16	Tensile Strength (lbs.)	ID	Use
½	1,000	One line at center	Pilot chute bridles, tie-downs
9/16	1,500	Two lines at center and two at selvage or three at center	Bridles
	2,250	Two lines at center	Bridles and retainers
¾	2,300	One line at center	Suspension systems for deployment bags
1	4,000	One line at center	Upper lateral band reinforcing, static lines

Section H. Slide Fasteners

H.1. Slide Fasteners Introduction

Slide fasteners, although simple to operate, are complex in construction. The AST has to be familiar with the construction of the slide fastener since the AST will be required to repair or replace a slide fastener on survival equipment or flight gear.

H.2. Slide Fastener

Slide fasteners (commonly referred to as zippers) are used on many types of fabric assemblies, such as flight jackets, flight suits and certain types of survival equipment. A common task in the day to day work of an AST is the installation and replacement of slide fasteners.

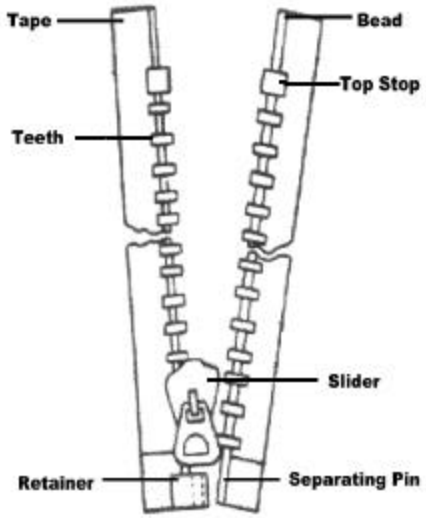
H.3. Separating and Non-separating

Slide fasteners are generally grouped into two categories:

- Separating
- Non-separating

H.4. Separating Slide Fastener

Assemblies, which must separate completely when opened, use a separating slide fastener. Separating slide fasteners are used on flight jackets, wetsuit tops and most sleeping bags.



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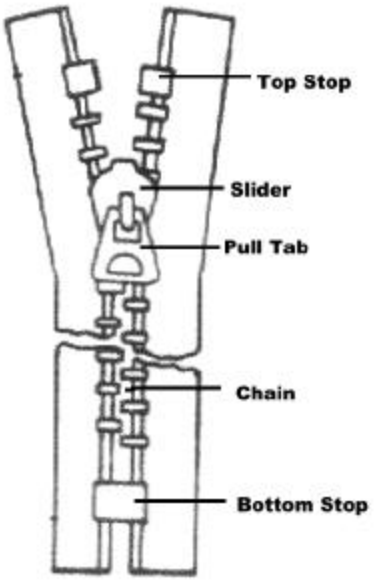
H.5. Non-separating Slide Fastener

When complete detachment of the fabric side is not desired, a non-separating slide fastener will be installed. Non-separating slide fasteners are commonly used on flight suits, exposure suits, B-4 bags.



H.6. Separating and Non-separating Slide Fastener Parts Identification

The previous illustrations show the parts of a separating and non-separating slide fastener. Notice the two are identical except for the bottom parts.

H.6.a. Tape and Bead

A closely woven cloth is used for the *tape* of a slide fastener. The inner edge of the tape has been enlarged during the weaving process, and is referred to as the *bead*.

H.6.b. Teeth

The individual interlocking elements of a slide fastener are commonly referred to as *teeth*. Teeth can be made of aluminum, brass, steel or plastic. The teeth are affixed to the bead.

H.6.c. Slider and Pull-Tab

The *slider* is the part that slides up and down the teeth causing them to interlock or separate. The slider is equipped with a *pull-tab* to assist in the movement of the slider.

Continued next page

H.6.d. Stops

Without some means of limiting the travel of the slider, it would easily slide off the end. Therefore, slide *stops* are installed to prevent this from happening. Non-separating slide fasteners have stops at the top and bottom. Separating slide fasteners have a stop at the top only.

H.6.e. Chain

One separate row of teeth is called a stringer. When they are joined they are called a *chain*.

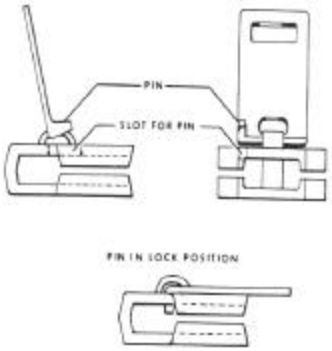
H.6.f. Separating Pin and Retainer

The two parts of a separating slide fastener are the *separating pin* and the *retainer*. The separating pin is used to align one side of the stringer and the retainer is used to hold the separation pin in place so proper alignment of the stringers is achieved during zipping and unzipping. The retainer also acts as a bottom stop so the slider does not come off the stringer.

Continued next page

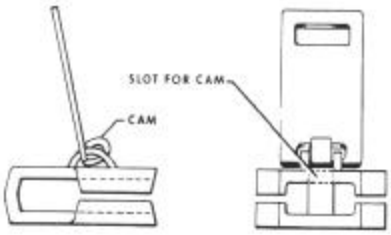
H.6.g. Locking Slider

On certain types of survival equipment, it is mandatory that the slider remains stationary where positioned on the chain. An accidental opening in flight of an equipment container, or flight clothing could cause considerable problems for the aviator. This is prevented by using a *locking slider*. When the tab on the slider is pressed flat, the pin or cam will prevent the slide from moving along the chain. Below is an illustration of a locking slide you will encounter in the AST shop.



H.6.h. Standard Non-locking Slider

The *standard non-locking slider* differs from the locking sliders in that it doesn't have any means of preventing its movement.



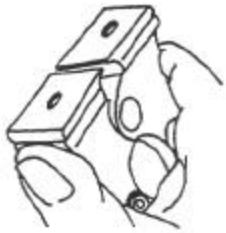
H.7. Pull-Up Pliers

Pull-up pliers are useful in closing the chain when the slider is missing.

Continued next page

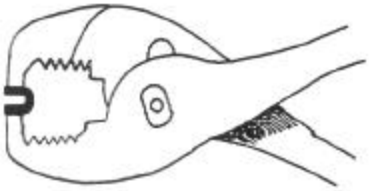
H.8. End-Cutting Nippers

In some instances, a slide fastener needs shortening to meet the requirements of a specific fabric assembly. To accomplish this modification, *end-cutting nippers* are used for removal of the stops and teeth as necessary.



H.9. Stop Pliers

Stop pliers are used to install stops. The stop is placed between the jaws of the pliers and then crimped over the bead of the slide fastener.



Section I. Hook and Pile Tape

I.1. Hook and Pile Tape Introduction

Hook and pile tape (Velcro®) is probably the most versatile invention in fastening devices. This unique fastener resulted from a combination of modern engineering and nature.

I.2. Hook and Pile Tape Construction

Hook and pile tape is manufactured from materials ranging from nylon and polyester to metal. The most common found is the nylon and polyester.

I.3. Hook and Pile Tape Advantages

Hook and pile tape has many advantages over other types of fasteners. It is easily cut to fit most any size, washable, and virtually snag and jam proof. Like other fasteners, hook and pile tape comes in different strengths.

I.4. Hook and Pile Tape Strength

Hook and pile tape strength is measured by the pounds of force necessary to pull the two sides apart when pressed together. The density of the hooks on the hook side and the density of the pile on the pile side can increase the strength of hook and pile tape.

Although hook and pile tape can be used numerous times over and over, with repetitive use the hooks will eventually begin to weaken causing the strength of the tape to diminish.

I.5. Attaching Hook and Pile Tape

Hook and pile tape can be attached either by cementing or sewing. Some hook and pile tape is pre-glued; just pull off the protective backing and attach.

The placement of the hook and pile tape will depend on the requirements of the specific assembly. Care should be taken to avoid locating the hook section in areas where it could rub, chafe, or irritate the wearer's skin.

I.6. Variety

Hook and pile tape is available in widths from to 2 inches and many colors.

Continued next page

I.7. Sewing Hook and Pile Tape

The attachment of hook and pile tape by sewing is a comparatively simple task. The following are procedures for sewing hook and pile tape.

Step	Action
1	Select the appropriate width and color tape.
2	Cut it to the proper length.
3	Trim the four corners of both sides to prevent curling
4	Sew a single row of stitches around all four edges, overlapping the stitch about 1-inch onto itself. **NOTE** Both pieces have a narrow selvage edge running lengthwise. Care should be observed when sewing to keep the stitches as close to this edge as possible.

I.8. Cementing Hook and Pile Tape

Procedures for cementing hook and pile tape may be found in chapter 2, section D.4, steps 2-5.

Section J. Snap Fasteners

J.1. Snap Fastener Introduction

The approved (MIL Spec) snap fasteners are sturdy, dependable, and require little or no maintenance. If properly installed and not damaged by accident or misuse, a fastener or grommet will usually outlast the fabric that it is installed on.

J.2. Durable-Dot

The most frequently used snap in the AST shop is a regular size wire spring clamp type, more commonly referred to as the *Durable-Dot*.

J.2.a. Durable-Dot Uses

The Durable-Dot fastener has a wide range of uses on medium weight to heavy weight fabrics. This fastener grips firmly, but will open and close easily from any direction. The Durable-Dot is widely used on flight clothing and survival equipment where a fastener has the capability of opening and closing from any direction.

J.2.b. Durable-Dot Sizes and Parts

Durable-Dot fasteners are available in two sizes: *regular* and *small*. It has four individual parts as shown below.

J.3. Pull-the-Dot

A snap fastener similar in appearance to the Durable-Dot is the *Pull-the-Dot*. The Pull-the-Dot is a three way locking fastener that will only release when pulled from the proper direction. The Pull-the-Dot has the same part names as the Durable-Dot. The socket has a lip on the inside that causes the snap to stay securely fastened.

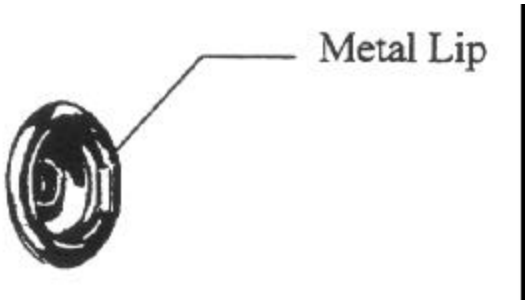
J.3.a. Pull-the-Dot Uses

Pull-the-Dot snaps are used on the chinstrap on the SPH-5CG Helmet.

Continued next page

J.3.b. Pull-the-Dot Sizes and Parts

The Pull-the-Dot is available in only one size, *regular*. Even though the Pull-the-Dot has the same part names as the Durable-Dot, the parts themselves are not interchangeable. Below is an example of the metal lip inside the socket that causes the snap to stay securely fastened.



J.4. Lift-the-Dot

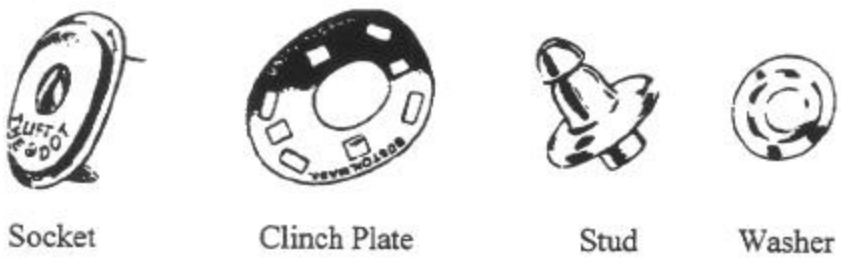
The *Lift-the-Dot fastener* is a heavy-duty fastener, technically known as a curtain type fastener. It has a wide range of uses in Coast Guard aircraft. The Lift-the-Dot is very different in design from the Pull-the-Dot, but it also only releases from one side like the Pull-the-Dot.

J.4.a. Lift-the-Dot Uses

Common places were Lift-the-Dot fasteners are used is aircraft soundproofing, first-aid kits, and protective covers.

J.4.b. Lift-the-Dot Sizes and Parts

The Lift-the-Dot is available in two sizes: *large* and *small*. It has four individual parts as shown below.



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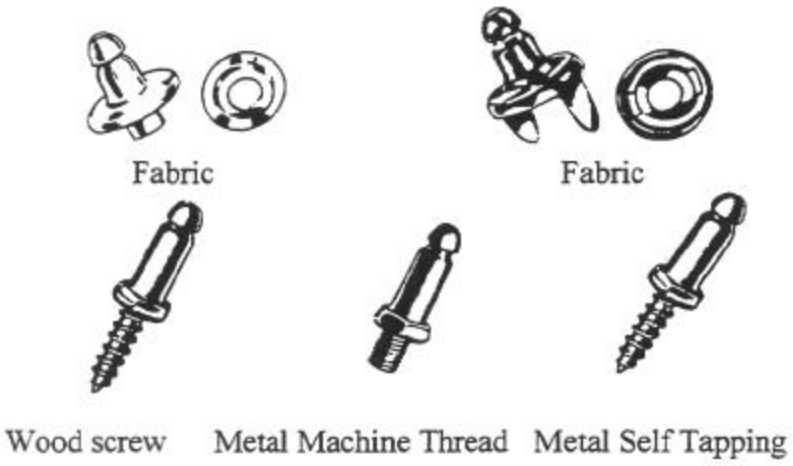
J.4.c. Lift-the-Dot Stud Styles

Besides fabric-to-fabric installation, Lift-the-Dot fasteners can be used for attaching fabric to wood or metal surfaces. The illustration below shows the available styles of Lift-the-Dot studs.



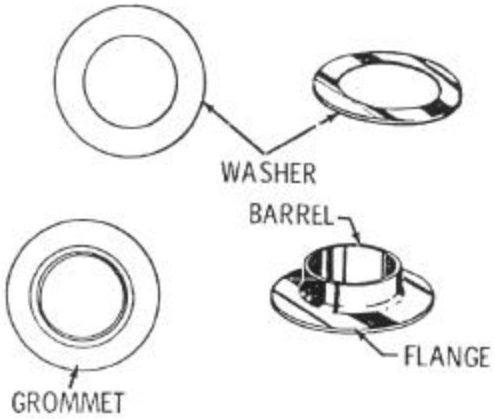
Section K. Grommets

K.1. Grommet Introduction

ASTs are frequently required to manufacture covers to protect pieces of equipment. Normally, these covers must be tied down to prevent loss in high winds. The fastening device used when tying or lashing is the grommet. The grommet is used as reinforcement around a hole. Because stress will be applied around the hole, a grommet is installed to prevent a tear or rupture.

K.2. Grommet Parts

Grommets are used on fabric assemblies and are made from either brass or aluminum. It has two individual parts as are shown below.



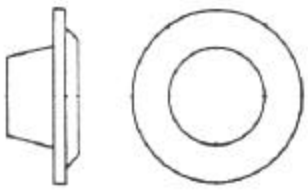
K.3. Grommet Types

Grommets for fabric assemblies are manufactured in two types, *plain* and *spur*.

K.4. Plain Grommet

The plain grommet is installed on lightweight fabric projects and on projects that will not apply heavy stress on the grommet.

Plain grommets are available in eight different sizes ranging from 00 through 6 (00, 0, 1, 2, 3, 4, 5, 6).



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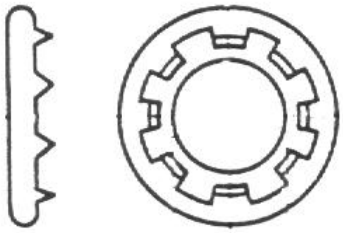
K.5. Spur Grommet

Spur grommets are generally used on heavy fabrics where considerable stress will be applied, and on loosely woven materials to aid in gripping the weave. Spur grommets are available in six different sizes ranging from 0 through 5 (0, 1, 2, 3, 4, 5).



K.6. Grommet Storage

Plain and spur grommets and washers should not be kept in the same storage drawers or containers. Spur and plain grommet parts are not interchangeable, and mixing them could contribute to a costly error.

Enclosure (6) Minimum Flight Gear

Minimum Flight Gear Issued to Coast Guard Aviation Flight Personnel			
	ITEM	R/W	F/W
1	Flight Suit	2 EA	2 EA
2	Flight Gloves, Summer	2 PR	2 PR
3	Flight Gloves, Winter (Model # MP11911, Non-Pilot Only)	1 PR	1 PR
4	Flight Boots, Summer (As Required)	1 PR	1 PR
5	Flight Boots, Winter (As Required)	1 PR	1 PR
6	SPH-5CG Helmet	1 EA	N/A
7	Survival Knife **(1)**	1 EA	1EA
8	Bag, Helmet	1 EA	1 EA
9	B-4 Parachute Bag	As Required	As Required
10	Flight Jacket **(2)**	1 EA	1 EA
11	Underwear (Nomex)	2 PR	2 PR
12	Socks, Winter	3 PR	3 PR
13	Aircrew Dry Coveralls (ADC) w/ Undergarment	1 EA	N/A
14	Aircrew Anti-Exposure Coveralls (Stearns, Mac-10, or Mac-100)	As Required	N/A
15	Shorty Wet Suit (To be worn under a MAC-10 or MAC 100)	1 EA	N/A
16	Sunglasses, HGU-4/P **(3)**	1 PR	1 PR
17	Winter Suit **(4)**	As Required	As Required
18	Jacket, Foul-Weather (Blue aramide)	1 EA	1 EA

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Minimum Flight Gear Issued to Coast Guard Aviation Flight Personnel
NOTES
(1) Each unit commanding officer will determine the appropriate knife for their AOR from the list of authorized knives in this manual. (2) Each unit commanding officer will determine the appropriate jacket for their AOR from the list of authorized jackets in this manual. (3) Only the HGU-4/P Sunglasses shall be worn while conducting aircraft maintenance or performing flight duties. Personnel requiring prescription sunglasses shall only wear military issued glasses while conducting aircraft maintenance or performing flight duties. (4) Each unit commanding officer will determine the appropriate winter suit (non-flight) for their AOR, to be used for post egress survival purposes.