

CHAPTER 9

LRU-13/A (MK-7) LIFERAFT ASSEMBLY

Section 9-1. Description

9-1. GENERAL.

NOTE

New procurements of seven-man liferafts will be designated LRU-13/A. Reference to the designation MK-7 has been deleted throughout this chapter. However, all procedures and requirements referenced in this chapter pertaining to the LRU-13/A also apply to MK-7 liferafts.

9-2. The LRU-13/A is a seven-man inflatable liferaft intended for use by aircrewmembers forced down at sea. It is stowed in a readily accessible area inside the fuselage on all applicable aircraft except the C-2 series. In the C-2 series aircraft it is stowed in the liferaft compartment.

9-3. CONFIGURATION.

9-4. The LRU-13/A liferaft assembly consists of a seven-man inflatable liferaft constructed of polychloroprene-coated cloth and an inflation assembly (CO₂ cylinder with inflation valve). Two internal vertical bulkheads divide the flotation tube into two separate compartments (bow and stern). A noninflatable floor is attached to the main tube and the bottom of the inflatable seat. An inflatable seat is manually inflated through a topping-off valve. A lifeline encircles the flotation tube. A righting line and accessory container securing line are attached to the lifeline. Survival equipment is stowed in the accessory container and in a supply pocket attached to the main tube. A sea anchor is attached to the bow and a boarding stirrup to the stern. There are two topping-off valves on the main tube, two heaving lines, three boarding handles,

and three righting handles on the underside of the floor. See figure 9-1 through 9-4.

NOTE

To make up the packaged assembly complete with accessories and survival items, all required components not supplied with the liferaft assembly must be individually requisitioned.

The following subassemblies have been deleted from newly procured LRU-13/A liferafts; hammock patches, starboard supply pocket, mast holder and socket, oarlock components and emergency equipment container (62A82D8-2). New liferafts shall not be reworked to add subassemblies and older liferafts shall not be reworked to remove subassemblies since their presence is not detrimental to the function of the liferaft.

9-5. APPLICATION.

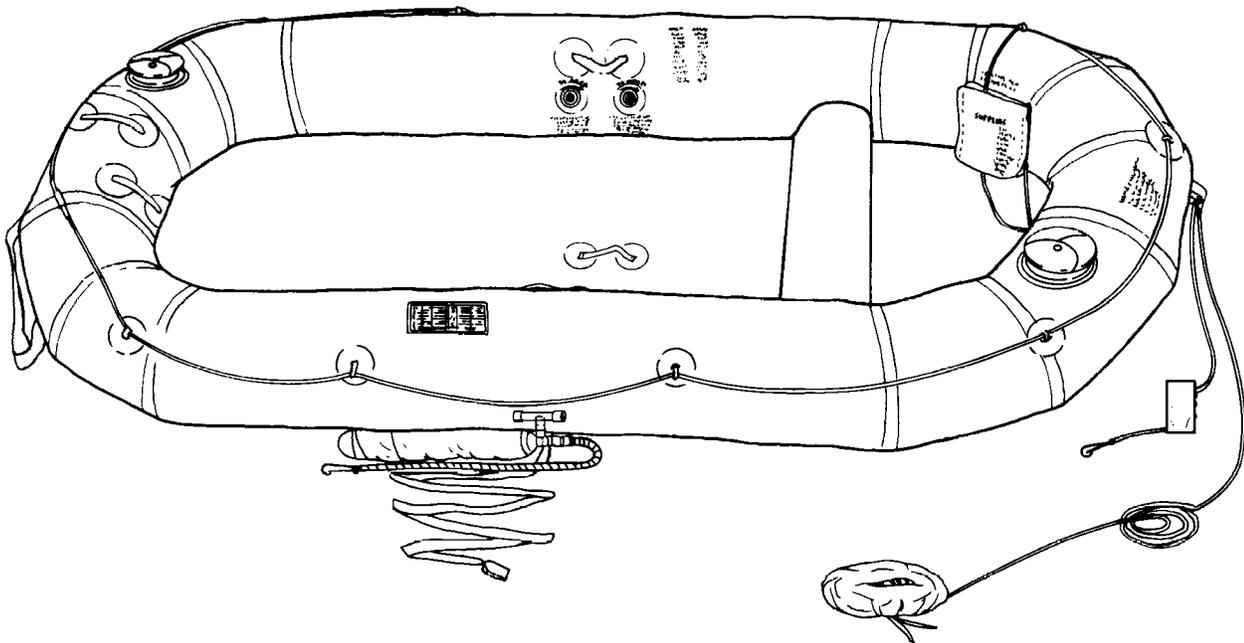
9-6. Multi-place liferafts are authorized for all rotary and fixed wing transport aircraft. Selection shall be based on mission, available storage space, and total number of crew and passengers carried. Additional consideration shall be made for the liferaft inspection cycle. C-130 series (except the C-130J) wing storage is limited to the LRU-15/A in the wing installation configuration. The C-130J wing storage is limited to the LRU-33/A and the Air Cruisers 46-man P/N 63880-103/104. The V-22 is limited to the LRU-34/A and liferafts listed in the current V-22 flight clearance.

Table 9-1. Deleted

9-7. FUNCTION.

9-8. The LRU-13/A liferaft assembly (droppable) is inflated by pulling the inflation assembly ripcord handle, located under the carrying case end flap. The

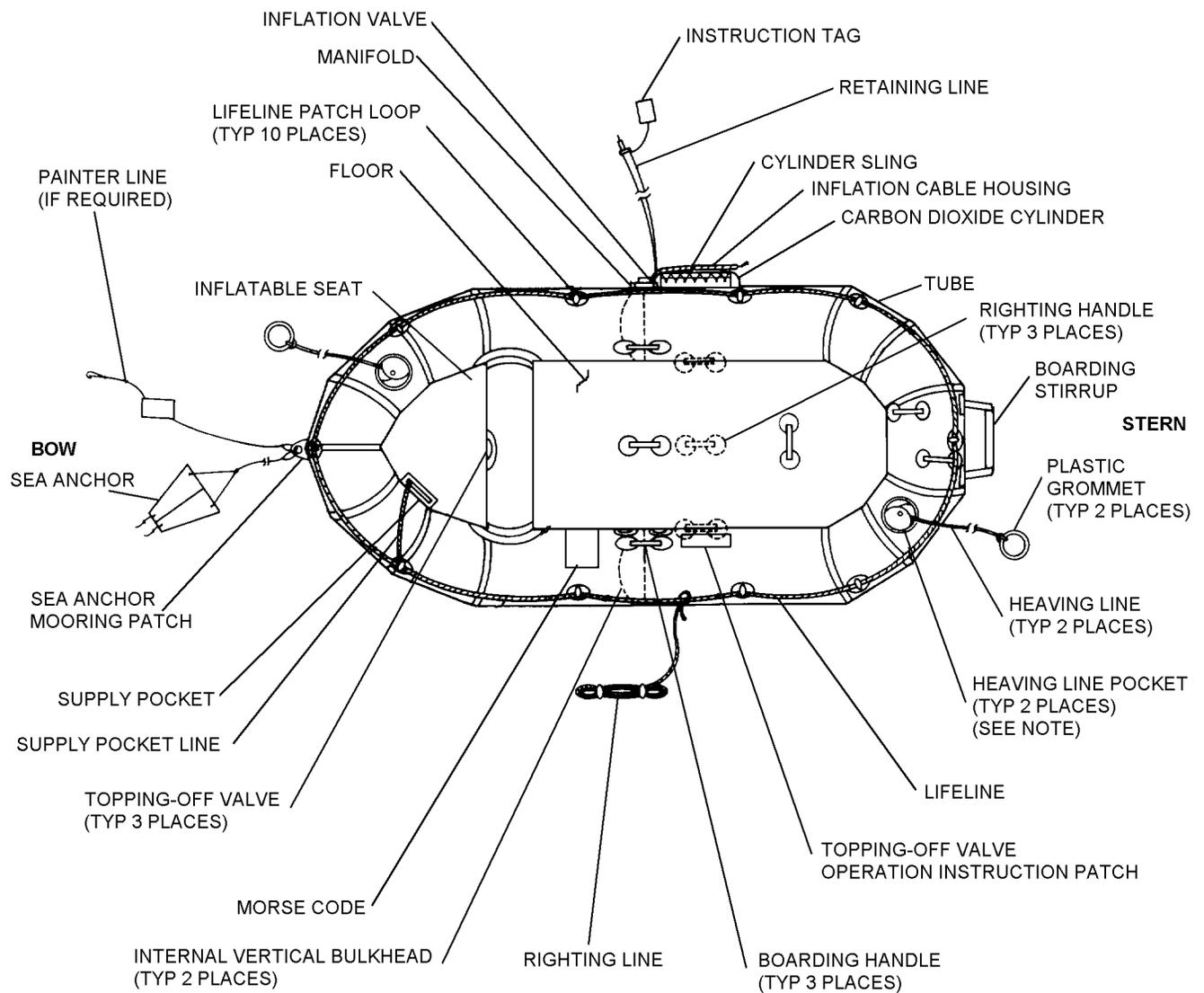
LRU-13/A liferaft assembly (liferaft compartment installation) is automatically inflated and ejected after the liferaft compartment door has been released. After boarding, the seat should be inflated through the topping-off valves with the hand pump provided in the accessory container.



NOTE: NEWLY PROCURED LRU-13/A LIFERAFT ASSEMBLIES WILL BE CONFIGURED WITH HEAVING LINE ASSEMBLIES. EARLIER CONFIGURATIONS WITHOUT HEAVING LINES WILL BE CONSIDERED SERVICEABLE.

Figure 9-1. LRU-13/A Liferaft Assembly

10090001



NOTE: NEWLY PROCURED LRU-13/A LIFERAFT ASSEMBLIES WILL BE CONFIGURED WITH HEAVING LINE ASSEMBLIES. EARLIER CONFIGURATIONS WITHOUT HEAVING LINES WILL BE CONSIDERED SERVICEABLE.

Figure 9-2. LRU-13/A Liferaft Assembly Parts Nomenclature

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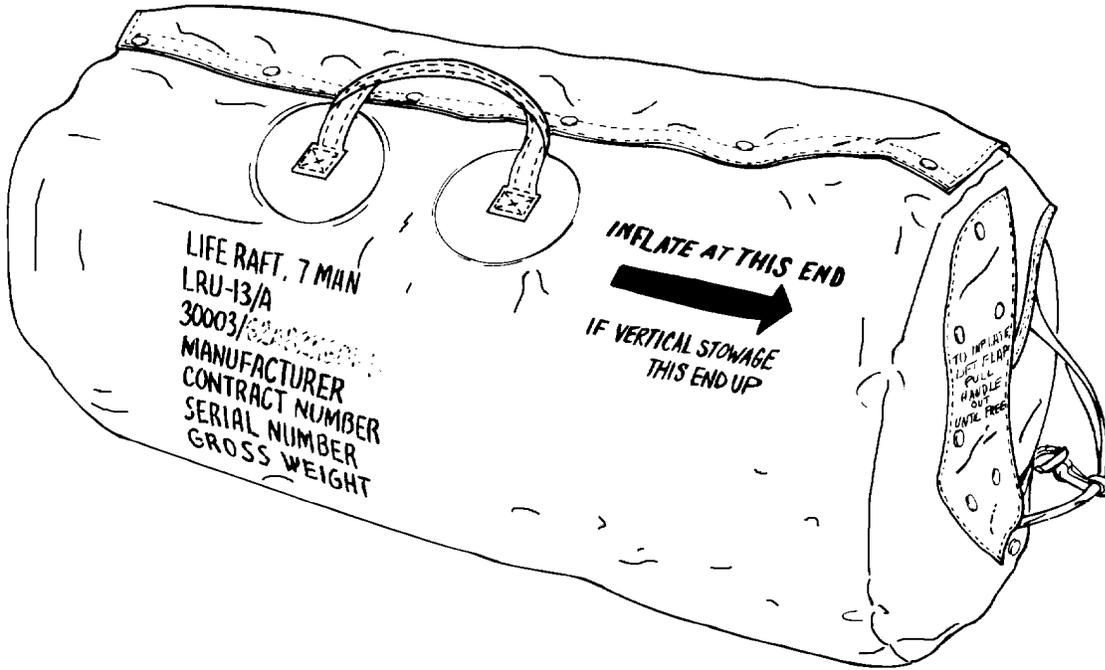
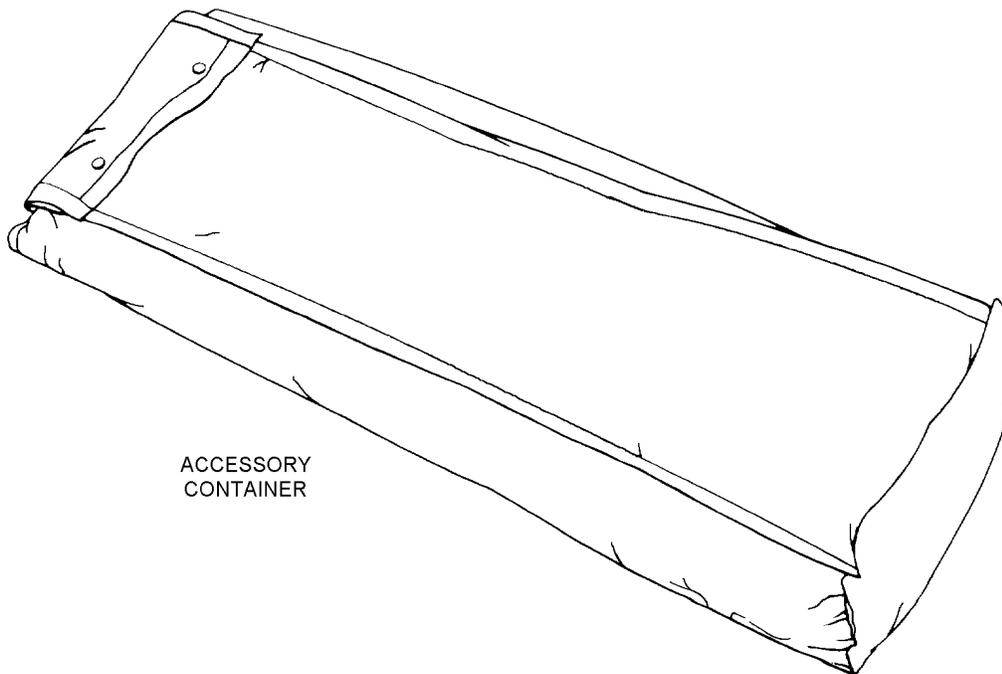


Figure 9-3. LRU-13/A Liferaft Assembly Carrying Case

10090003



ACCESSORY
CONTAINER

Figure 9-4. LRU-13/A Liferaft Assembly Accessory Container

10090004

Section 9-2. Modifications

9-9. GENERAL.

9-10. There are no authorized modifications to the LRU-13/A liferaft assembly at this time. Common

repairs and fabrications to maintain serviceability are listed in table 9-2.

Table 9-2. LRU-13/A Liferaft Common Repairs and Fabrications

Description of Repair or Fabrication	Paragraph Number
Determination of Repairability	9-50
Cementing Liferafts	9-51
Patching Liferafts	9-52
Recementing or Replacing Seam Tapes	9-53
Sea Anchor/Mooring Line Replacement	9-54
Addition of International Morse Code Patch	9-56
Relocation of Liferaft Retaining Line Instruction Tag	9-57
Fabrication of Painter Line Pouch	9-58
Drilling Holes in P/N A128-RT-1 Pull Cable Housing	9-59
Drilling Holes in P/N IV0303 (Vee Mfg.) Inflation Valve	9-60
Drilling Holes in P/N A128 Inflation Valve	9-61
Drilling Holes in P/N 971444 Inflation Valve	9-62
Fabrication of Cylinder Valve Antichafing Sleeve	9-63
Fabrication of 10-Foot Retaining Line	9-64
Fabrication of Boarding Handle Assembly	9-65
Fabrication of Boarding Stirrup Assembly	9-66
Fabrication of Righting Lines	9-67
Replacement of Topping-Off Valve	9-68
Repair Procedures for Carrying Case and Handles	9-69
Replacement/Repair of Lifelines	9-70
Replacement of Liferaft Heaving Line	9-71
Replacement of Locking Cones (Liferaft Cases)	9-72

Section 9-3. Maintenance

9-11. GENERAL.

9-12. This section contains information on inspection, disassembly, repair/replacement, testing, and reassembly of the LRU-13/A liferaft.

9-13. INSPECTION.

9-14. All liferaft assemblies shall be subjected to Preflight/Special and Calendar/Phase Inspections.

9-15. The Preflight Inspection shall be performed on fuselage-installed liferafts prior to first flight of the day. This inspection shall be performed by line personnel (plane captain or delegated aircrewmember) who have been designated by the line division officer, instructed and found qualified by the Aviator's Equipment Branch.

9-16. The Special Inspection shall be performed on fuselage-installed liferafts every 30 days. This inspection shall be performed at the organizational level of maintenance by personnel assigned to the Aviator's Equipment Branch. Upon completion, the date of inspection and inspector's signature shall be entered on appropriate form in accordance with OPNAVINST 4790.2 Series.

9-17. All liferafts shall be subjected to the Calendar/Phase Inspection prior to placing in service or, if an aircraft inventory item, at the time of the aircraft Acceptance Inspection. Thereafter, the Calendar/Phase Inspection interval shall coincide with the aircraft inspection cycle in which they are installed, except the helicopter back pack, which shall be inspected every 360 days. See applicable Planned Maintenance System (PMS) publications for specific intervals. In no case shall the interval exceed 231. Unless operational requirements demand otherwise, the liferaft Calendar/Phase Inspection shall be performed by intermediate level of maintenance or above.

NOTE

A functional test and pull cable proof load test shall be performed prior to placing in service or during aircraft Acceptance Inspection, and each fourth inspection cycle thereafter. A leakage test shall be performed at each inspection cycle. If inspection indicates damage beyond capability of maintenance, complete applicable forms in accordance with OPNAVINST 4790.2 Series and forward entire assembly to supply. Refer to [paragraph 9-50](#) for determination of repairability.

9-18. QUALITY ASSURANCE. The procedures detailed present a logical sequence for proper inspection. Quality assurance steps are provided for critical operations. When a step is underlined, the Aircrew Survival Equipmentman shall perform the operation, then have performance verified by a Quality Assurance Representative (CDI, CDQAR, or QAR) prior to proceeding to the next operation. Work center supervisors are primarily responsible for quality assurance and in accordance with OPNAVINST 4790.2 Series may nominate experienced personnel in their work center to be screened and examined by the Quality Assurance Officer prior to their designation by the Commanding Officer as a Collateral Duty Inspector. In no case shall an Aircrew Survival Equipmentman perform his own quality assurance inspection. Procedures for quality assurance are listed following major operations.

9-19. PREFLIGHT/SPECIAL INSPECTION (FUSELAGE-INSTALLED LIFERAFTS). To perform a Preflight/Special Inspection, visually inspect for the following:



Do not open liferaft access doors or any sealed or safety-wired/safety tied portion of liferaft for this inspection.

1. Fabric for cuts, tears, deterioration and abrasion.
2. Seams for proper adhesion or stitching.

3. Straps and handles for security and wear.
4. Any other parts for wear, damage and security.
5. All hardware for security of attachment, corrosion, damage, wear, and if applicable, ease of operation.
6. Liferaft retaining line for proper stowage.
7. Liferaft painter line for presence and attachment.
8. Heaving line for proper stowage (if applicable).
9. Ensure that liferaft is properly stowed. Check for bulges caused by trapped air in liferaft.
10. Ripcord pins and cable for bends, fraying, or other damage; ripcord pins for security of attachment to cable.
11. Swaged ball on handle and swaging sleeve on cable for security.

WARNING

Use only authorized safety tie. No tape, wire, or cord shall be employed to secure ripcord pins.

12. Ripcord pins fully inserted into cones, and first and last ripcord pins safety-tied to cones with one turn size E nylon thread (V-T-295), single.
13. Snap fasteners on end flaps and ripcord protector flap securely fastened.
14. If discrepancies are found or suspected, Maintenance Control shall be notified.

9-20. ACCEPTANCE/CALENDAR/PHASE INSPECTION. The Acceptance/Calendar/Phase Inspection consists of the following major tasks (to be performed in the order listed):

1. Container/Case Inspection
2. Functional Test (If Required)
3. Pull Cable Proof Load Test (If Required)
4. Deflation
5. Visual
6. Liferaft Configuration

7. General Inspection
8. Markings Inspection
9. Survival Items and Accessories Inspection
10. Inflation Assembly Inspection
11. Inspection of Inflation Assembly (Charged)
12. Inspection of Inflation Assembly (Discharged)
13. Cylinder Markings
14. Leakage
15. Records Updating
16. Repacking

9-21. PACKED CONTAINER/CASE INSPECTION. To inspect packed containers/cases, examine the following:

1. Fabric for cuts, tears, deterioration, and abrasion.
2. Seams for proper adhesion of stitching.
3. Straps and handles for security and wear.
4. Any other parts for wear, damage, and security.
5. All hardware for security of attachment, corrosion, damage, wear and, if applicable, ease of operation.
6. Container and/or case for stains, dirt, and general condition.

9-22. FUNCTIONAL TEST. To functionally test a liferaft, proceed as follows:

CAUTION

Ensure that there is adequate area free of foreign objects for liferaft inflation.

1. Open liferaft case and unfold liferaft. The functional test shall be performed with the carbon dioxide bottle that was attached during the raft's last inspection. If actuation of the attached bottle will cause it to be non-RFI due to hydrostatic test requirements, and no replacement bottles are available, contact fleet support team for instructions.
2. Actuate inflation assembly.

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3. Measure time of inflation; liferaft shall inflate to design shape without evidence of restriction in less than 1 minute.

4. Examine liferaft for obvious damage such as cuts, tears, ruptured seams, and damaged manifold.

5. Determine cause if liferaft does not properly inflate. Remove CO₂ bottle and inflation assembly and inspect inlet valve for cleanliness and embedded foreign matter.

6. If correction is made, repeat [steps 2 through 4](#).

7. Deflate liferaft in accordance with [paragraph 9-24](#). Ensure that all carbon dioxide has been removed.

9-23. PULL CABLE PROOF LOAD TEST. To perform the proof load test, proceed as follows:

NOTE

Perform the Proof Load Test only after the functional test and prior to placing an inflation assembly in service.

1. Remove inflation valve cover plate.

2. Remove pull cable from valve and apply a 50-pound pull force between cable ball and snaphook.

3. Examine pull cable for broken strands of wire, deformed snaphook, security of snaphook spring latch attachment, and loose or cracked swage fittings. If any damage is found, the pull cable shall be discarded and replaced with a new cable. The new cable shall also be tested in accordance with [step 2](#). If snaphook spring latch is loose, it may be repaired in accordance with instructions contained in modification section for the liferaft, or replaced at the discretion of the inspection activity.

4. If pull cable passes this test, reinstall in accordance with [paragraph 9-46](#).

9-24. DEFLATION. To deflate liferaft, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Pump, Vacuum Unit	61E44688 (CAGE 80049)
As Required	Hose, Rubber, 3/8 or 1/2 inch Inside Diameter	—

1. Attach one end of rubber hose to vacuum pump.

2. Deflation through topping-off valve. Open valve and hold vacuum pump hose over opening in valve. When compartment is collapsed, screw valve closed.

9-25. VISUAL INSPECTION. Prior to visually inspecting a liferaft assembly, the liferaft shall be inflated with air to 1.0 psig.



Remove CO₂ cylinder prior to inflating liferaft with air.

1. Remove CO₂ cylinder from CO₂ cylinder sling.



Ensure that diffuser plug is installed in CO₂ cylinder.

NOTE

If a suitable air source is not available, water pumped nitrogen (FED SPEC BB-N-411) may be substituted.

2. Inflate liferaft with air to 1.0 psig.

9-26. LIFERAFT CONFIGURATION. The liferaft shall be updated by comparing it to the configuration illustrations in [Figures 9-1 through 9-4](#) and [Figure 9-22](#).

9-27. GENERAL INSPECTION. To perform the general inspection, inspect the following:

NOTE

If color, location, or stitching patterns of repaired, replaced, or previously incorporated noncritical items or features (eg, life-raft pockets, handle, ballast bag, sea anchor, etc.) do not exactly conform to instructions, do not remove or rework item or feature if flotation stability or capability and security of attachment are not compromised.

1. Liferaft fabric for cuts, tears, punctures, deterioration and abrasion.
2. Seam tapes for proper adhesion.
3. Seam tapes joining tubes to floors, other tubes or canopy for adhesion and wear.
4. Liferaft floor and canopy for cuts, tears, punctures, and abrasions.
5. All patches for proper adhesion.
6. Pockets for tears, abrasions, and security of attachment.
7. Handles for wear, deterioration, and security of attachment.
8. Sea anchor for wear, tears, and security of attachment.
9. Oral inflation tube, as applicable, for deterioration.
10. Damaged or deteriorated topping-off valves, if applicable, and security of retaining screw.
11. All hardware for security of attachment, corrosion, damage, wear, and, if applicable, ease of operation.
12. Liferaft for stains, dirt, and general cleanliness.
13. Any other parts for wear and damage.

9-28. MARKINGS INSPECTION. Compare markings on liferaft and case and/or container to markings shown in [table 9-3](#) and [9-4](#). Restore faded markings.

Install/replace International Morse Code patch as needed: refer to [paragraph 9-56](#). Correct any markings which do not agree with the applicable table. To change markings, proceed as follows:

Materials Required		
Quantity	Description	Reference Number
As Required	Ink, Marking, Laundry, Black	SPE-92 NIIN 00-161-4229
	-or-	
	Ink, Drawing, Waterproof, Yellow	A-A-59291 NIIN 00-634-6583

1. Paint over incorrect marking using waterproof ink (yellow or black as applicable).
2. Add correct marking as close as possible to specified location using waterproof ink.

9-29. SURVIVAL ITEMS AND ACCESSORIES INSPECTION. To inspect survival items and accessories, proceed as follows:

NOTE

With the exception of batteries, items reaching overage while packed in survival kits and rafts shall remain in service until the next inspection cycle of the completed assembly.

1. Inventory all accessories and survival items by checking items against [table 9-5](#). Replace missing or unsatisfactory items.

NOTE

NAVAIR 13-1-6.5 contains information inspection/replacement and modification of the survival items.

Ensure URT-33 battery service life does not expire prior to the next scheduled calendar inspection. Refer to NAVAIR 16-30URT33-1 for battery service life. Batteries which exceed service life requirements must be discarded regardless of their condition.

2. Inspect all items for damage, spent contents, and expired service life. Replace as necessary.

Table 9-3. LRU-13/U Liferaft Markings

Marking	Location	Letter Height
LIFERAFT, INFLATABLE 7-MAN TYPE LRU-13/A USN 30003/62A82H2- [applicable dash number] MANUFACTURER'S IDENTIFICATION CONTRACT NO. [applicable number] DATE OF MANUFACTURE [month and year] SERIAL NO. [applicable number]	Tube, starboard side of bow, outboard	1/2 inch
KEEP ACCESSORIES TIED TO RAFT TO AVOID LOSS IN CASE OF CAPSIZING	Tube, port side of bow, inboard	5/8 inch
INFLATION VALVE OPERATION TO INCREASE TUBE PRESSURE 1. SCREW HAND PUMP INTO VALVE CAP 2. ROTATE VALVE CAP 1 1/2 TURNS TO RIGHT 3. PUMP TO INFLATE TO DESIRED PRESSURE 4. ROTATE VALVE CAP 1 1/2 TURNS TO LEFT AND REMOVE PUMP TO DECREASE PRESSURE 1. ROTATE VALVE 1 1/2 TURNS TO THE RIGHT AND BLEED	Under or along side of the topping-off valves on the port liferaft tube inboard and seat tube	3/8 inch 1/4 inch 3/16 inch 1/4 inch 3/16 inch
INTERNATIONAL MORSE CODE [see figure 9-11]	Inboard, port side, aft of seat	1/4 inch
BEFORE INFLATION CLIP SNAPHOOK TO LIFE VEST	On tag attached to webbing retaining line	3/8 inch
TUBE SECTION NUMBERS	Each tube section	1/2 inch
SUPPLIES KNIFE, COMPASS, STEADY BURNING LIGHT, WHISTLE, FLARE GUN, CODE CARD, NYLON CORD, STROBE LIGHT, RADIO	Supply pocket, port side	1/2 inch 1/4 inch
SEA ANCHOR MIL-A-3339B Type I Size 2 MANUFACTURER CONTRACT NO. [applicable number] DATE OF MANUFACTURE [month and year]	Inside sea anchor	1/4 inch
HEAVING LINE	Stenciled on tube, inboard below assembly	1/2 inch
Note: Replacement markings shall be stamped or stenciled using waterproof black ink.		

Table 9-4. LRU-13/A Case and Container Markings

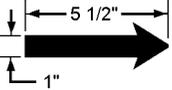
Case/Container	Marking	Location	Letter Height
Carrying Case	LIFERAFT, INFLATABLE, 7 MAN LRU-13/A 30003/62A82H601-1 MANUFACTURERS IDENTIFICATION CONTRACT NO. [applicable number] SERIAL NO. [applicable number] GROSS WEIGHT [stencil applicable numbers]	Side panel	1 inch
	INFLATE AT THIS END 	Both sides of case at pull handle end	1 inch 
	1 inch		
	IF VERTICAL STOWAGE THIS END UP	Both sides of case below arrow	1 inch
	INFLATE OTHER END	End panel opposite pull handle end	1 inch
	TO INFLATE, LIFT FLAP, PULL HANDLE OUT UNTIL FREE	Pull handle flap	1/2 inch
Accessory Container	Each accessory container shall be marked with the name of the equipment stored in the container. Refer to table 9-5 .	Front panel	1/2 inch
Note: Replacement markings shall be stamped or stenciled using waterproof black ink.			

Table 9-5. LRU-13/A Survival Items

Description	Quantity Required	Reference Number	NIIN	SM&R Code
<u>Packed In Accessory Container</u>				
Desalter Kit, Sea Water, MK2, Type II (Note 10)	4	MIL-D-5531E	00-372-0592	PAOZZ
Sea Dye Marker	4	MIL-S-17980	00-270-9986	PAOZZ
Distress Signal, MK-124 MOD 0 or Signal Kit, MK-189 MOD 0 (Note 9)	6	—	01-030-8330	—
	1	—	L564-1370-01-418-2657	—
Water Storage Bag (Size A)	3	MIL-B-8571	00-485-3034	PAOZZ
Water, Drinking, Bagged, Emergency (Note 12)		—	01-124-4543	PAOZZ
	w/ MROD	7		
	w/o MROD	18		
First Aid Kit, Size A	1	SC-C-6545-IL Vol. #2	00-922-1200	—
Desalinator, Manual Reverse Osmosis (Notes 1 and 12)	1	—	00-313-6086	—
Sunburn Preventative Preparation	1	MIL-S-37800	01-121-2336	PAOZZ
Food Packet, Liferaft	7	MIL-F-15381	01-028-9406	PAOZZ
Bailing Sponge	1	L-S-626	00-240-2555	PAOZZ
Hand Pump	1	MIL-P-8258	00-097-4580	PAOZZ
Combat Casualty Blanket Type I	1	MIL-B-36964	00-935-6665	PA--Z
Hand Generated Flashlight A-9 (Note 2)	1	MIL-F-8209	00-283-9806	PAOZZ
<u>Packed In Supply Pocket</u>				
Flare Gun, MK-79 MOD 0 (Note 9)	1	—	00-866-9788	PAOZZ
Signal Light (Strobe) SDU-5/E or Signal Light (Strobe) SDU-39/N	1	MIL-L-38217	00-067-5209	PAOZZ
			01-411-8535	
Light, ChemiLuminescent (Note 11)	2	95277-80	01-334-4274	PAOZZ
Signal Mirror, Type I (Note 3) or Signal Mirror, Type II	1	MIL-M-18371	00-105-1252	PAOZZ
		MIL-M-18371	01-455-6695	PAOZZ
			01-455-6671	PAOZZ
Survival Radio (Notes 4 and 6) and/or Radio Beacon AN/URT-33A (Notes 4 and 8)	As Required	—	—	—
	As Required	MIL-B-38401	00-160-2136	PAOZZ
Code Card (Note 5)	1	—	—	—
Whistle, Type II	1	MIL-W-1053	00-254-8803	PAOZZ

Table 9-5. LRU-13/A Survival Items (Cont)

Description	Quantity Required	Reference Number	NIIN	SM&R Code
Compass, Pocket, Type MC-1 (Note 7) or Compass, Wrist	1 1	MIL-C-17850 WCC-100	00-515-5637 00-809-5252	PAOZZ PAOZZ
Pocket Knife	1	MIL-K-818C	00-162-2205	PAOZZ
Cord, Nylon, Utility, 50 feet	1	MIL-C-5040	00-240-2154	PAOZZ

Notes: 1. MROD shall be used in RFI as set forth available (See Note 12).
 2. Required for Arctic missions; optional otherwise.
 3. The Type II mirror (large) shall be utilized in lieu of the Type I mirror (small) until stock of the Type II mirror is depleted.
 4. Survival radio or radio beacon requirements shall be in accordance with OPNAVINST 3710.7 series. Following radios apply: Voice-Beacon: AN/PRC-90, AN/PRC-90-2, and AN/PRC-149. Beacon only: AN/URT-33, AN/PRT-5, and AN/PRC-140. The AN/PRC-149 will become the preferred radio when available.
 5. Refer to NAVAIR 13-1-6.5.
 6. If PRT-5 transmitters are carried, they shall be packed in the accessory container.
 7. Use MIL-C-17850 until stock is depleted, then use WCC-100.
 8. Ensure battery service life does not expire prior to next scheduled special inspection. Refer to the applicable manual for the installed radio for battery service life.
 9. MK-189 MOD 0 Signal Kit contains 6 MK-124 Day/Night flares and 2 MK-79 MOD 0 flare guns. If MK-189 MOD 0 is used, MK-79 will not be put in supply pocket.
 10. Authorized for use in Arctic/Antarctic environments.
 11. Chemical Lights will replace SDU-30. If chemical lights are not available SDU-30 may be used until next repack.
 12. MROD should not be used where water temperatures are below 36°F.

3. Operate all items which are not expended in use. Replace as necessary.

9-30. INFLATION ASSEMBLY INSPECTION. Inspect inflation assemblies as follows:

2. Examine inflation assembly for evidence of corrosion, wear, loose screws, and dents. If damage or extensive wear is found, replace valve, cylinder, housing, or pull cable. If pull cable is replaced, perform pull cable proof load test in accordance with paragraph 9-23.

9-31. Inspection of Inflation Assembly (Charged). To inspect a charged inflation assembly, proceed as follows:

NOTE

To obtain the correct gross weight of the CO₂ cylinder, subtract weight of the diffuser plug from total weight indicated on scale.



Gas under pressure. Do not attempt to remove valve from cylinder.

1. Inspect cylinder markings. Re-mark as required in accordance with paragraph 9-33.

3. Weight inflation assembly. If weight indicated on scale is not the same as the gross weight printed on the cylinder (P/N MS26545B2C205A or P/N MS26545B4C205A) with tolerance specified, or if no gross weight is printed on the cylinder, discharge the cylinder and recharge it to 4.64 to 4.76 lbs in accordance with paragraph 9-45.

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4. Inspect safety wire to ensure that wire size and type are as specified in paragraph 9-46. If necessary, safety-wire the assembly in accordance with paragraph 9-46.

9-32. Inspection of Inflation Assembly (Discharged). To inspect a discharged inflation assembly, proceed as follows:

1. Inspect cylinder markings. Re-mark as required in accordance with paragraph 9-33.

2. Check date of last hydrostatic test. If greater than 5 years see paragraph 9-42 for disposition.

3. Examine inflation assembly for evidence of corrosion, wear, loose screws, and dents. If damaged or extensive wear is found, replace valve, cylinder, housing, or pull cable. If pull cable is replaced, perform pull cable proof load test in accordance with paragraph 9-23.

4. Recharge assembly in accordance with paragraph 9-45.

9-33. Cylinder Markings. Markings on all CO₂ inflation cylinders shall be in black letters 1/4 inch high. Information shall include gross weight, tare weight, and weight of CO₂. In addition, multiplace liferaft cylinders shall be marked with the following information in 1-inch red letters: WARNING - COMPRESSED GAS - DO NOT DROP. Paint and stencil cylinder as required. Weight of CO₂ is 4.64 to 4.76 lbs. Ensure that all markings are included as necessary.

9-34. LEAKAGE TEST. To perform a leakage test, proceed as follows:



Liferaft should not be disturbed during leakage test.

9-35. Test Fixtures. As assembled, test fixtures are not stocked in the Supply System; fixtures must be fabricated to meet the requirements of the schematic shown in figure 9-5. A suggested test fixture consisting of a three, way valve, pressure gage, and suitable

adapters for the compartments being tested is shown in Chapter 3.

9-36. Test Procedure. To test liferafts for leakage, using test fixture shown in Chapter 3, proceed as follows:



Ensure that area surrounding liferaft is clear of foreign objects.

If three-way valve is not used, measuring device valve must be closed when air-feed valves are open.

NOTE

If a suitable air source is not available, water-pumped nitrogen (BB-N-411) may be substituted.

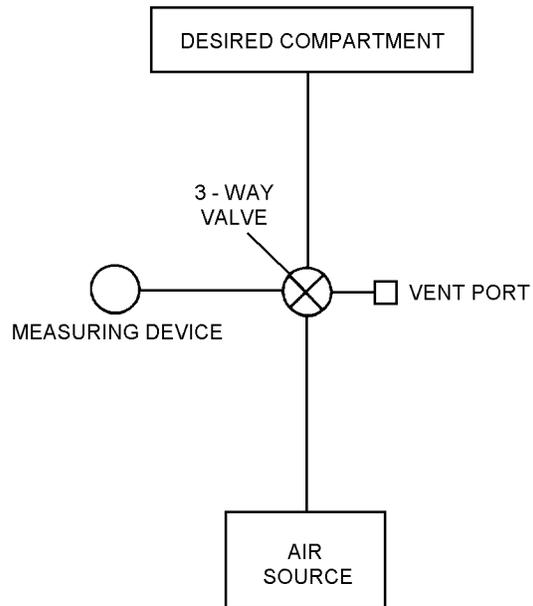


Figure 9-5. Test Fixture Schematic

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Table 9-6. Flotation Compartment Pressures

LRU-13/A Compartment	Leakage Test Pressure (psig)	Minimum Pressure (psig)
Bow Section	2.0	1.60
*Inflatable Seat	1.0	0.60
*Stern Section	2.0	1.60

*Compartments may be tested simultaneously.

1. Open topping-off valve then thread adapter into topping-off valve threads. Open air supply valve and inflate liferaft. Alternately position valve at measuring device, vent and air supply until proper pressure is attained. Refer to [table 9-6](#).

2. The air supply shall be securely shut off and after a minimum of 15 minutes, the pressure shall be readjusted, if necessary, to the leakage test pressure. Refer to [table 9-6](#).

3. Disconnect air supply and check for leaks. Ensure that all valves are closed.

4. Record temperature and barometric pressure and allow raft to remain undisturbed for a minimum of 4 hours.

6. Record temperature and barometric pressure and correct test pressure for any changes in temperature and barometric pressure. Refer to [tables 9-7](#) and [9-8](#).

EXAMPLE

UNCORRECTED TEST READING 1.70 PSI

	TEMP.	BARO.
START	75° F	29.90 IN. Hg
END	70° F	29.70 IN. Hg
DIFFERENCE	- 5° F	-0.20
CORRECTION	+0.155	-0.098

TEMP. CORRECTION	+ 0.155
+ BARO. CORRECTION	- 0.098
CORRECTION	+ 0.057

UNCORRECTED READING	1.700 PSI
+ CORRECTION	+ 0.057
CORRECTED READING	1.757 PSI

NOTE

If the raft has been stacked during the 4-hour inspection period remove from stacking and place in a horizontal position on the floor or table in the inspection area and take test pressure reading. In no event shall the pressure in the raft be determined with another raft stacked upon it.

5. At the end of a minimum of 4 hours after the readjustment period in [step 2](#) record test pressure.

NOTE

[Steps 6 through 13](#) shall be performed only after leakage test readings have been recorded.

Step 6 - Para 9-36

10036006

Table 9-7. Temperature Conversion Chart

Temperature Difference (Degree F.)	Correction (psi)
1	0.031
2	0.062
3	0.093
4	0.124
5	0.155
6	0.186
7	0.217
8	0.248
9	0.279
10	0.310

Rise in temperature: subtract from gage reading.
Fall in temperature: add to gage reading.

Table 9-8. Barometric Pressure Conversion Chart

Press. Diff. (inHG)	Corr. (psi)								
0.01	0.005	0.16	0.078	0.31	0.152	0.46	0.225	0.61	0.299
0.02	0.010	0.17	0.083	0.32	0.157	0.47	0.230	0.62	0.304
0.03	0.015	0.18	0.088	0.33	0.162	0.48	0.235	0.63	0.309
0.04	0.020	0.19	0.093	0.34	0.167	0.49	0.240	0.64	0.314
0.05	0.025	0.20	0.098	0.35	0.172	0.50	0.245	0.65	0.319
0.06	0.030	0.21	0.103	0.36	0.176	0.51	0.250	0.66	0.323
0.07	0.035	0.22	0.108	0.37	0.181	0.52	0.254	0.67	0.328
0.08	0.040	0.23	0.113	0.38	0.186	0.53	0.260	0.68	0.333
0.09	0.045	0.24	0.118	0.39	0.191	0.54	0.265	0.69	0.338
0.10	0.049	0.25	0.123	0.40	0.196	0.55	0.270	0.70	0.343
0.11	0.054	0.26	0.127	0.41	0.201	0.56	0.275	0.71	0.348
0.12	0.060	0.27	0.132	0.42	0.206	0.57	0.279	0.72	0.353
0.13	0.064	0.28	0.137	0.43	0.211	0.58	0.284	0.73	0.358
0.14	0.069	0.29	0.142	0.44	0.216	0.59	0.289	0.74	0.363
0.15	0.073	0.30	0.147	0.45	0.221	0.60	0.294	0.75	0.368

Rise in pressure: add to gage reading.
 Fall in pressure: subtract from gage reading.

7. If pressure of compartment is below pressure limits in [table 9-6](#), inflate to leakage test pressure and check for leaks, using a soap solution. Mark leaks, rinse with fresh water, and dry with a lint free cloth. Determine repairability in accordance with [paragraph 9-50](#).

8. Apply a small amount of soap solution to manifold, and inspect for leaks. Inspect for damage, excessive wear and corrosion.

9. Apply a small amount of soap solution around topping-off valve and check for leaks.

10. Deflate liferaft in accordance with [paragraph 9-24](#).

11. Attach retaining line to neck of cylinder with a lark's head knot.

12. Install cylinder valve anti-chafing sleeve.

13. Reinstall properly charged inflation assembly.

14. Tighten coupling nut to raft inlet manifold to a torque value of 140 to 150 in-lb.

15. Lace cylinder sling closed and snap cover over lacing where applicable.

9-37. RECORDS UPDATING. Make necessary entries on the appropriate form in accordance with OP-NAVINST 4790.2 Series.

9-38. CLEANING AND SERVICING.

9-39. Cleaning and servicing consists of cleaning the liferaft and containers and/or cases, checking hydrostatic test date on multiplace liferaft CO₂ cylinders, inspecting/replacing poppet assembly, replacing the safety disc and washer on inflation valves, recharging CO₂ cylinders and safety-wiring inflation valves.

9-40. CLEANING OF LIFERAFTS. To clean liferafts, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Detergent, General Purpose	MIL-D-16791 NIIN 00-282-9699
As Required	Cloth, Lint-Free, Type II	MIL-C-85043 NIIN 00-044-9281
As Required	Talc, Technical	MIL-T-50036A NIIN 01-080-9589



Solvents are not to be used in the cleaning of liferafts.

1. Prepare solution of detergent (MIL-D-16791) consisting of 1/4 to 1/2 ounce of detergent per gallon of water.
2. Apply cleaning solution to soiled area with a spray or sponge.
3. Allow solution to remain on the surface for several minutes, then agitate with a soft brush or rag.
4. Rinse surface thoroughly with water; wipe with a cloth or sponge. Repeat this application until surface is free from all solution.
5. Dry liferaft with a lint-free cloth and apply a light coating of talc.

9-41. CLEANING OF CONTAINERS AND/OR CASES. Clean in accordance with [paragraph 9-40](#).

9-42. HYDROSTATIC TEST. Inspect CO₂ cylinders used on multiplace liferafts to determine if the previous hydrostatic test was within the last five years. However, a fully charged cylinder (charged to the cylinder gross weight) is considered serviceable, regardless of the last hydrostatic test date, until discharged. If over five year due date for testing, and cylinder has been discharged, proceed with hydrostatic test:



Bottles should be turned in for testing as close to due date as possible. Extending hydrostatic testing by leaving bottle charged may result in corrosion build up on inside of cylinder, which may cause a malfunction during actuation.



Wire-wrapped cylinders must have wire-wrapping removed prior to hydrostatic testing; cylinders passing the hydrostatic test must be rewound prior to placing back in service.

Wire-wrapped cylinders must have letter W at end of part number. Cylinders received without the W at end of part number do not require wire-wrapping.

Materials Required

Quantity	Description	Reference Number
1	Washer, Sealing	A128-13 (CAGE 34009) NIIN 00-159-2599
	-or-	
1	Parts Kit, Valve	ASV710 (CAGE 34009) NIIN 00-999-7662

NOTE

Ensure that all CO₂ cylinders received from Supply, except those used on one-man life-rafts, have siphon tubes installed.

1. Disconnect the cylinder and valve assembly from the raft. Remove and retain valve for the replacement cylinder.

2. Mark appropriate form "Hydrostatic Test Required" in accordance with OPNAVINST 4790.2 Series and return old cylinder to Supply.

NOTE

Ensure that all CO₂ cylinders received from Supply, except those used on one-man liferafts, have siphon tubes installed.

3. Obtain a replacement cylinder. Before installing valve on cylinder, gently tap inverted cylinder with a small piece of wood. If any rust or other contamination falls from cylinder, do not use that cylinder; draw another cylinder and repeat contamination check.

4. Check for installation of siphon tube.

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5. Replace stem in inflation assembly valve if necessary.

6. Install a new sealing washer.

7. Thread inflation valve onto cylinder and tighten to a torque value of 165 to 175 ft-lb.

8. Charge cylinder and reconnect valve and cylinder to liferaft as appropriate.

9-43. INSPECTION/REPLACEMENT OF INFLATION VALVE POPPET ASSEMBLY. If leakage of CO₂ is from valve discharge port, inspect the valve poppet (P/N ASV-601, NSN 4220-00-507-6667) for worn seat as follows:

WARNING

Before performing any work on inflation valves, ensure that CO₂ inflation assemblies are completely discharged. Do not remove valve from a charged CO₂ assembly.

Materials Required

Quantity	Description	Reference Number
1	Washer, Sealing	A128-13 (CAGE 34009) NIIN 00-159-2599
	-or-	
1	Parts Kit, Valve	ASV 710 (CAGE 34009) NIIN 00-999-7662
1	Valve Poppet Assembly	P/N ASV-601 NIIN 00-507-6667

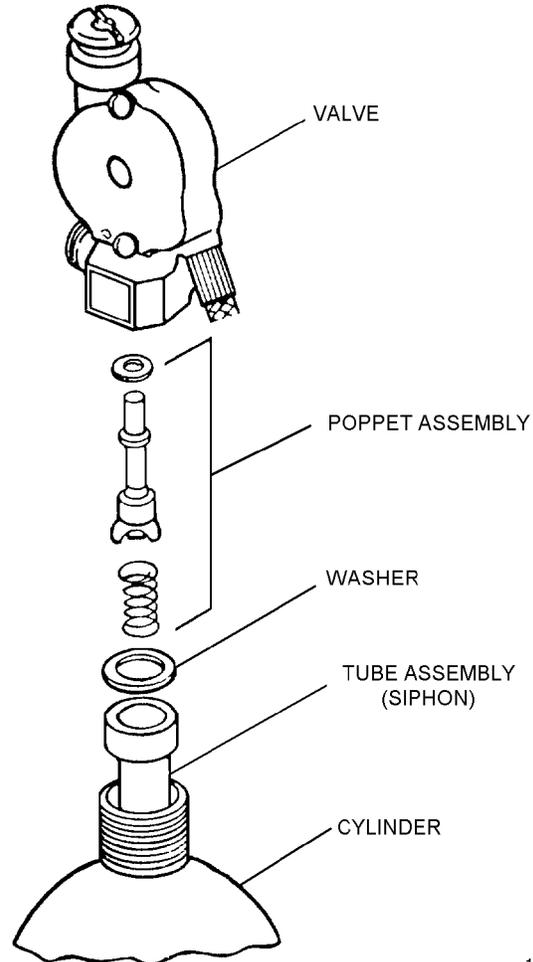
1. Remove cylinder from liferaft.

2. Remove valve from cylinder.

3. Disassemble valve ([Figure 9-6](#)) and inspect poppet for worn seat. Replace poppet assembly if necessary.

4. Install a new sealing washer.

5. Thread inflation valve onto cylinder and tighten to a torque value of 165 to 175 ft-lb.



10090006

Figure 9-6. Valve Poppet Disassembly

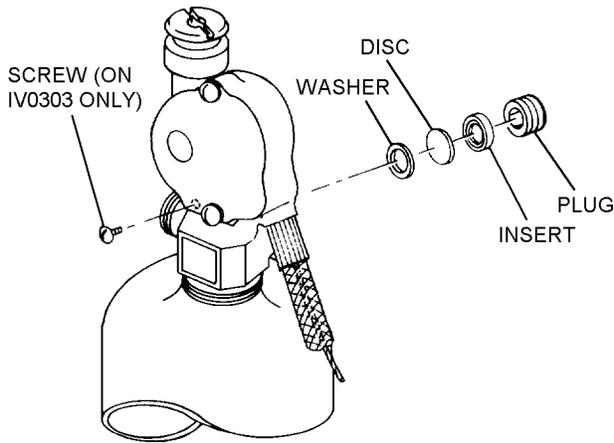
9-44. REPLACEMENT OF SAFETY DISC AND WASHER ON INFLATION VALVES. (See [figure 9-7](#).) To replace safety disc and washer on inflation valve assemblies (A-128/871444 and MIL-V-81722 (FLU-6/P) proceed as follows:

WARNING

Before performing any work on inflation valves, ensure that CO₂ inflation assemblies are completely discharged. Do not remove valve or valve safety disc plug from a charged CO₂ assembly.

6. Tighten safety plug on A-128/871444 to 29 ft-lb of torque.

9-45. RECHARGING. To recharge the inflation assembly, proceed as follows (see [figure 9-8](#)):



INFLATION VALVE
P/N A-128, P/N 871444, P/N IV0303

1009007

Figure 9-7. Disassembly of Inflation Valve Safety Disc Assembly

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, Torque	—
1	Socket, 5/16 inch	—

Materials Required

Quantity	Description	Reference Number
1	Repair Kit (Insert, Washer, Disc)	903684 (CAGE 33525) NIIN 00-703-7811
1	Hex Stock, 5/16 x 2 inch Length	—

1. Remove cylinder from liferaft.
2. Remove safety disc plug; insert safety disc and washer.
3. Place new washer into inflation valve safety disc orifice.
4. Place new safety disc into inflation valve safety disc orifice.
5. Replace insert and safety disc plug.

NOTE

While tightening the safety disc plug, align insert with plug.

WARNING

When discharging partially charged or overcharged CO₂ cylinders, hold firmly in place with a suitable holding device (vice). Protect CO₂ cylinder from vice jaws with cloth or a suitable substitute. Position cylinders so escaping gas is not directed toward any personnel.

NOTE

Inspect CO₂ cylinders for multiplace life-rafts before recharging. Refer to [paragraph 9-32](#).

Charged inflation assemblies used as spare replacements shall be inspected in accordance with [paragraph 9-31](#) prior to raft installation.

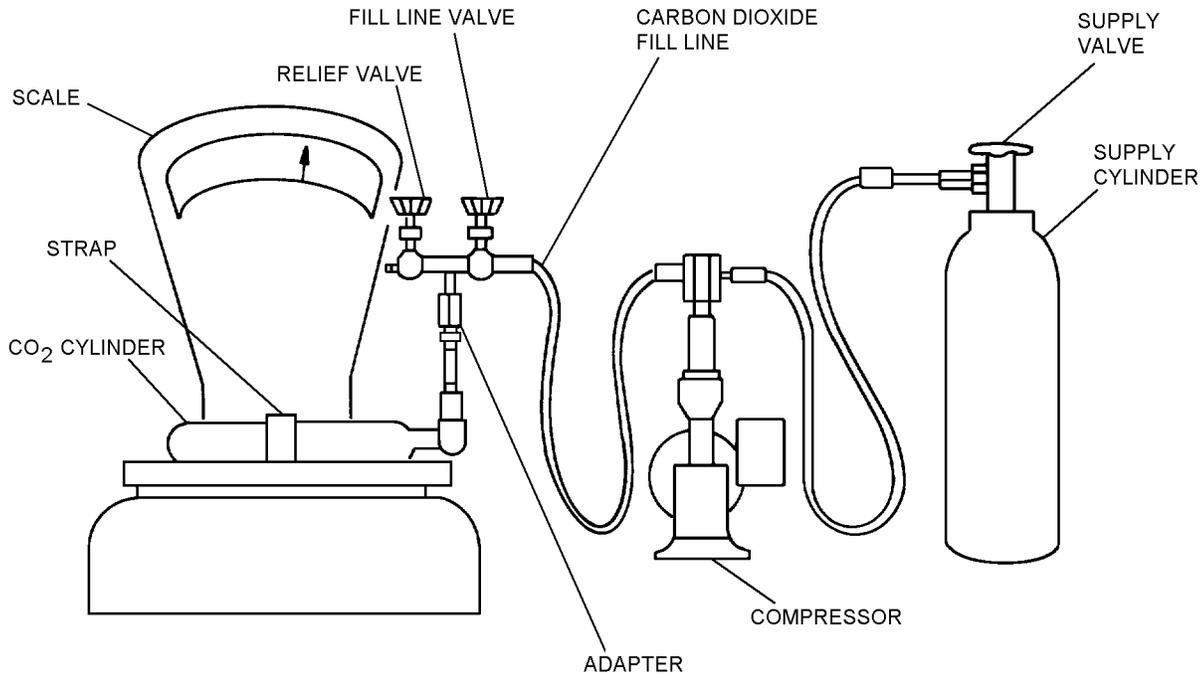
To perform the following filling procedures it is necessary to ensure that CO₂ cylinder is completely discharged.

1. Remove inflation valve cover and rotate cam with screwdriver to open position.
2. Weigh and record tare weight (empty weight cylinder, valve and cable assembly) of inflation assembly. Correct tare weight marking on cylinder if necessary.

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.

3. Install proper charging adapter on inflation assembly.



NOTE: SUPPLY CYLINDERS NOT EQUIPPED WITH SYPHON TUBE SHALL BE INVERTED USING TILT RACK.

10090008

Figure 9-8. Recharging Schematic

4. Secure inflation assembly to weighing pan.

5. Open supply cylinder valve, fill line valve and relief valve to purge fill line. Close fill line valve and relief valve.

NOTE

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.

6. Connect fill line to inflation assembly and zero scale.

NOTE

Proper charge weight is 4.64 to 4.76 lbs.

7. Ensure inflation assembly valve is open.

8. Open fill line valve.

9. Allow carbon dioxide to cascade from supply cylinder into inflation assembly. If gross weight (tare weight plus 4.64 to 4.76 lbs) cannot be reached, start compressor and complete charging. Stop compressor upon reaching proper gross weight.

10. Close fill line valve.

11. Close inflation assembly valve. Open relief valve on fill line valve if applicable.

12. Disconnect fill line from inflation assembly. Remove charging adapter.

13. Measure gross weight of charged inflation assembly.

14. 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 16.

15. Reinstall diffuser plug, if applicable.

NOTE

When other cylinders are to be recharged immediately, leave supply cylinder valve open.

16. Close supply cylinder valve and bleed system pressure.

NOTE

Remove cover plate on multiplace liferaft valve assemblies.

17. Immerse inflation assembly in water tank.

CAUTION

If inflation valve leaks from discharge port, inspect inflation valve poppet assembly in accordance with [paragraph 9-43](#).

18. Check for leaks; then remove assembly from tank and dry with an air blast. Wipe assembly with a lint-free cloth.

NOTE

After storage period, inflation assembly should be checked for proper weight.

19. If required, re-mark tare weight, gross weight, charge weight on cylinder.

20. Safety-wire the assembly in accordance with paragraph 9-46.

9-46. SAFETY-WIRING. To safety-wire the inflation assembly, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Torque Meter	—
1	Special Socket	—
1	Dial Push/Pull Gage	DPPH50 (CAGE 11710) or equivalent NIIN 00-473-0108

WARNING

To ensure that proper safety wire is used on liferaft inflation assemblies, a tensile strength test shall be performed on a sample of wire from each spool intended for this use prior to using.

Materials Required

Quantity	Description	Reference Number
As Required	Wire, Aluminum, 0.032-inch Diameter, Temper 0	QQ-A-225/1 NIIN 00-595-8200
2	Screw, Brass	MS35273-2 NIIN 00-720-8657
2	Washer, Lock	MS35333-10 NIIN 00-011-5551
As Required	Seal, Lead	NIIN 00-598-3427
1	Pin, Steel	—

1. Secure one end of a 12-inch sample of aluminum wire (0.032-inch diameter) to a stationary support.

2. Attach opposite end to pull scale; then apply a pull force.

NOTE

Tensile strength of sample shall be 8 to 15 pounds.

3. Remove valve cover plate and ensure correct routing of pull cable. See [figure 9-9](#).

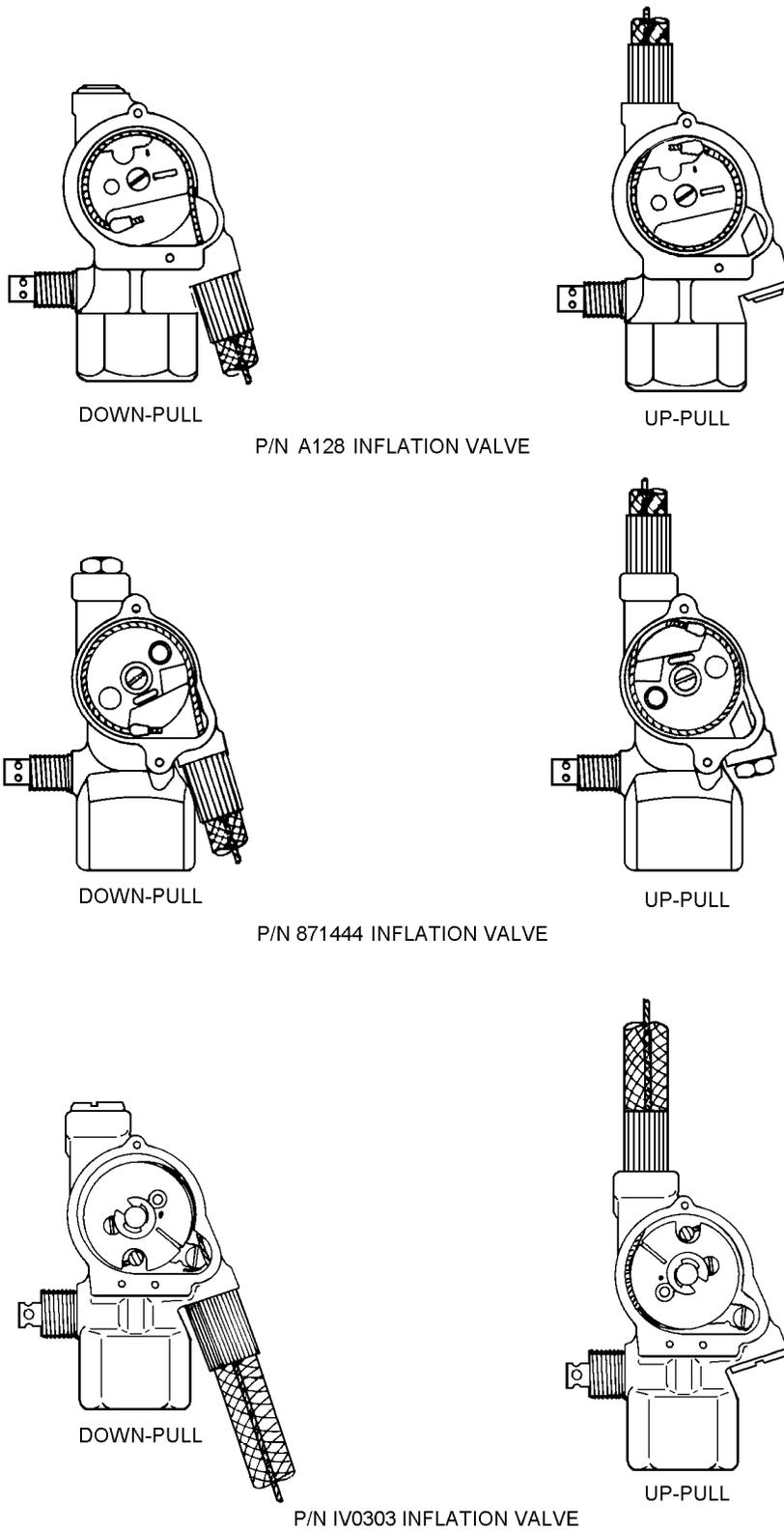


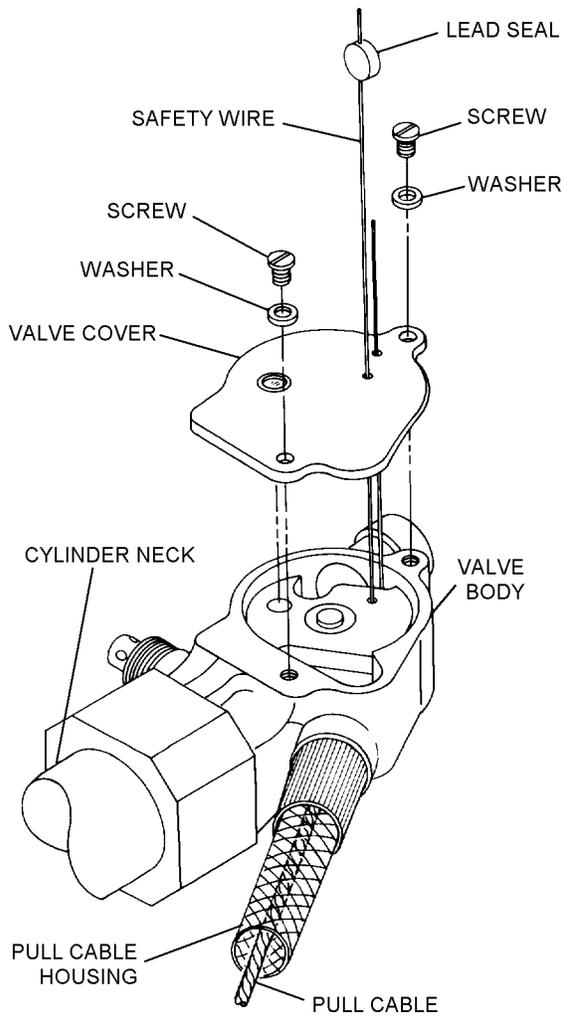
Figure 9-9. Routing of Multiplace Liferaft Pull Cable

10090009

NOTE

Ensure that pull cable has been proof load tested in accordance with [paragraph 9-23](#).

4. Route safety-wire as shown. Use 0.032-inch diameter aluminum wire.



TYPICAL INSTALLATION OF SAFETY WIRE

Step 4 - Para 9-46

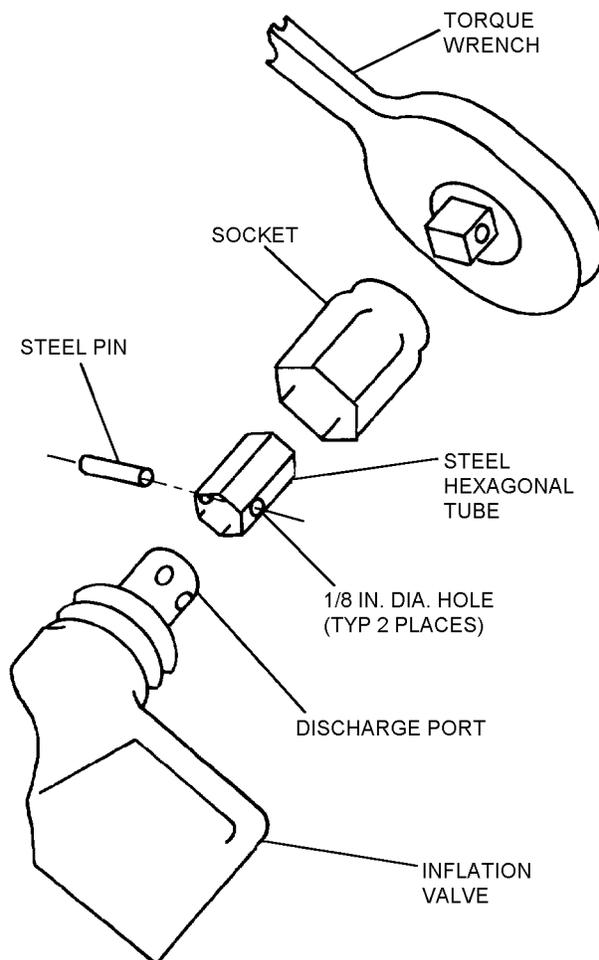
10046004

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5. Replace valve cover. Twist ends of safety wire to achieve maximum tautness and crimp lead seal. Ensure that pull cable is properly installed. Green dot should be visible in valve cover window.

6. Examine inflation valve to ensure the presence of screw and lockwasher.

7. Tighten discharge port to a torque valve of 60 ± 5 in-lb.



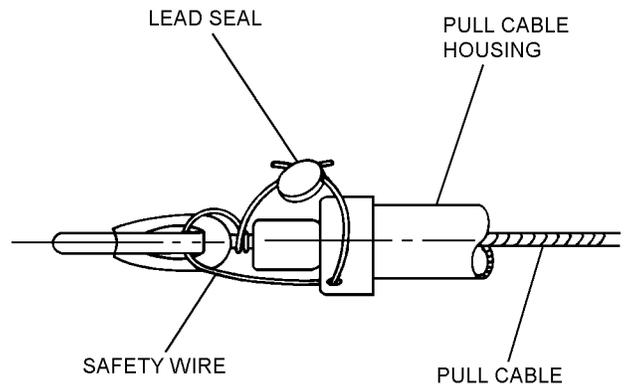
Step 7 - Para 9-46

10046007

NOTE

Multiplace liferafts used in aircraft wing compartments shall be safety-wired according to applicable aircraft maintenance instructions.

8. Safety-wire pull cable to pull cable housing as shown. Use 0.032-inch diameter aluminum wire. Refer to paragraphs 9-59 through 9-62 for pull cable hole location.



TYPICAL REMOTE PULL CABLE SAFETY WIRING

Step 8 - Para 9-46

10046008

9. If inflation assembly is to be stored, attach a red tag with the following instructions printed in ink: **WARNING: WEIGH INFLATION ASSEMBLY BEFORE INSTALLING ON LIFERAFT. DO NOT INSTALL IMPROPERLY CHARGED CYLINDER OR IMPROPERLY SAFETY-WIRED INFLATION VALVE.**

9-47. REPAIR/REPLACEMENT.

9-48. This section contains instructions for the repair or replacement of various components or subassemblies of the LRU-13/A liferaft to ensure that appropriate items of equipment remain in Ready For Issue (RFI) status. Reference numbers for minor parts which are defective, corroded or worn and require replacement are included in the applicable paragraph of this section. Otherwise, refer to Section 9-4. All repairs shall be documented by making necessary entries on appropriate form in accordance with OPNAV-INST 4790.2 Series.

9-49. Replacement of easily removed assembly components such as CO₂ inflation valves are authorized in addition to repair and replacement procedures documented in this section. The liferaft shall be subjected to

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a functional and leakage test each time CO₂ inflation valves are removed and replaced for any reason, and each time valve gaskets are replaced.

9-50. DETERMINATION OF REPAIRABILITY. Liferafts shall be considered beyond repair for any of the following reasons:

1. Porous fabric areas on tubes.
2. Split or open tube seams.
3. Leakage test failure resulting from other than cut, tear, or puncture.
4. Damaged, malfunctioning, excessively worn, or corroded inlet valve, manifold assembly or oral inflation tube, as applicable.
5. Damaged, malfunctioning, or excessively corroded topping-off valve that cannot be corrected by replacement of topping-off valve opening insert and washer.
6. Leaky bulkheads.
7. Extensively damaged floor.
8. Holes or abrasions exceeding 2 inches in length or diameter in pneumatic compartment.
9. Deterioration of the rubberized fabric caused by oil, grease, or any other foreign substance.
10. Deterioration of the rubberized fabric caused by a heavy mildewed condition.
11. Opening of air retaining seams for internal repair.
12. Rips, tears, or punctures in the pneumatic compartments which exceed 2 inches.
13. In the judgement of a competent inspector, requiring excessive repair.

9-51. CEMENTING LIFERAFTS. All cementing of liferafts shall be performed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Roller, Wooden	GGG-R-00620

Materials Required

Quantity	Description	Reference Number
1	Disposable Brush	NIIN 00-514-2417
As Required	Toluene	TT-T-548 NIIN 00-281-2002
	-or-	
As Required	Methyl Ethyl Ketone, (MEK)	TT-M-261 NIIN 00-281-2762
As Required	Adhesive, Class 3, Polychloroprene	MIL-A-5540 NIIN 00-142-9913
As Required	Talc, Technical	MIL-T-50036A NIIN 01-080-9589

WARNING

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

NOTE

Toluene shall be the primary solvent used in the fabrication or repair of this assembly. MEK may be used if toluene is not available. Always use solvents sparingly and wipe up excess solvents; do not allow to dry by evaporation.

Toluene or MEK must be applied vigorously to liferaft material over three years old in order to reactivate the material prior to cementing. Pigment from the material coloring staining a cloth rubbed over the treated surface will indicate the material has been reactivated. Adhesive shall be applied immediately after the surface has dried.

CAUTION

Use only Polychloroprene adhesives and Polychloroprene-coated cloth and patches on Polychloroprene-coated LRU-13/A life-raft assemblies.

1. Clean both surfaces to be cemented with four applications of toluene or MEK. Apply toluene or MEK with back-and-forth strokes on the first and third applications, and one-way strokes on the second and fourth applications. Allow areas to dry between applications.

2. Prepare cement and accelerator mixture. Prepare only enough mixture for 8 hours, as this is the effective active period for the mixture. Dispose of any remaining mixture at this time.

3. Using a disposable brush, apply adhesive to completely cover surfaces to be cemented. Use long one-directional strokes and complete each surface before adhesive becomes tacky as the brush may pull tacky adhesive from the surface. Allow to dry for ten minutes.

4. Apply a second coat of adhesive as in [step 3](#). Use brush strokes perpendicular to the original direction.

5. When second coat of adhesive has become tacky, place pieces together. If cemented area is a cut or tear, butt edges of damage before applying patch. Roll out bubbles with a wooden roller.

6. Allow adhesive to cure a minimum of 48 hours.

7. Dust area with talc.

9-52. PATCHING LIFERAFTS. To patch inflatable survival equipment, select color to approximately match item to be patched, and proceed as follows:

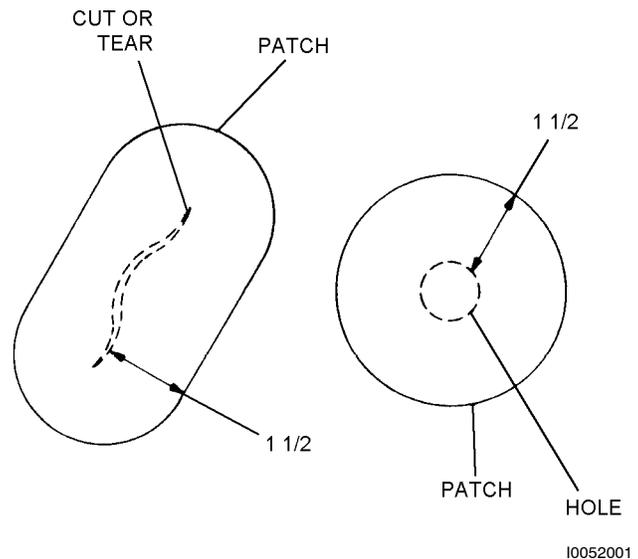
Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Laminated, Var. D, Blue	MIL-C-23070 NIIN 00-132-5009
	-or-	
	Cloth, Laminated, Var. C, Orange	MIL-C-23070 NIIN 00-081-5829
	-or-	
	Cloth, Laminated, Var. C, Yellow	MIL-C-23070 NIIN 00-926-6489

CAUTION

Use only Polychloroprene adhesives and Polychloroprene-coated cloth and patches on Polychloroprene-coated LRU-13/A life-raft assemblies.

1. Cut a rounded patch 1 1/2 inches larger than the damage on all sides.



Step 1 - Para 9-52

2. Scallop edges of patch if it is larger than 5 inches in diameter.

3. If damaged area in floor is larger than 1 inch, patches shall be applied to both sides.

4. Center patch over damage and trace on outline of patch on fabric.

5. Cement patch to damaged area in accordance with [paragraph 9-51](#).

6. Dust area with talc.

7. Perform a leakage test in accordance with [paragraph 9-34](#).

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9-53. RECEMENTING OR REPLACING SEAM TAPES. This repair shall be performed only if a flotation tube does not leak, that is, if only the outer seam tape is loose, or if the seam does not seal a flotation tube. To recement or replace a seam tape, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Toluene	TT-T-548 NIIN 00-281-2002
	-or-	
	Methyl Ethyl Ketone (MEK)	TT-M-261 NIIN 00-281-2762
As Required	Talc, Technical	MIL-T-50036A NIIN 01-080-9589

WARNING

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

CAUTION

Avoid excessive application of toluene or MEK on seams. Remove any spilled or excessive toluene or MEK immediately.

NOTE

Toluene shall be the primary solvent used in the fabrication or repair of this assembly. MEK may be used if toluene is not available. Always use solvents sparingly and wipe up excess solvents; do not allow to dry by evaporation.

Seam separation in floors and seats may be repaired provided safety and flotation capabilities are not compromised. Exercise sound judgement in determining whether such repairs are within local capabilities. All cementing shall be performed in accordance with [paragraph 9-51](#).

1. If tape is present and undamaged, recement tape to liferaft.

2. If tape is missing, measure and fit a replacement tape to area and cement in place. Overlap other seams a minimum of 1 inch.

3. If tape is damaged, peel damaged tape from liferaft. Apply toluene or MEK only as needed to loosen tape. Trim damaged tape and replace with new tape. Overlap other seam tape a minimum of 1 inch.

4. Perform leakage test.

9-54. SEA ANCHOR/MOORING LINE REPLACEMENT. To replace worn or damaged sea anchor or mooring line, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Sea Anchor, Type I, Size 2	MIL-A-3339
As Required	Cord, Nylon Type III	MIL-C-5040 NIIN 00-240-2146

1. (Complete Assembly Replacement) Secure free end of mooring line to sea anchor mooring patch on liferaft with bowline knot followed by an overhand knot.

2. (Mooring Line Replacement Only) Sear both ends of a 16-foot length of MIL-C-5040 Type III nylon cord. Secure one end to sea anchor bridle, and other end to sea anchor mooring patch on liferaft with bowline knot followed by an overhand knot.

9-55. INSPECTION RECORD PATCH.

NOTE

The 28th In-Service Management Panel meeting for Aviation Life Support Systems rescinded the requirement for the packer to sign the Inspection Record Patch on life-rafts. The requirement for all other record documentation remains unchanged. The reason for this change is that most Inspection Record Patches are unreadable, and the packer's and inspector's names, including the type of inspection (leak/functional), are documented on Aviation Crew Systems Records.

9-56. ADDITION OF INTERNATIONAL MORSE CODE PATCH. To fabricate and install an International Morse Code patch, proceed as follows:

1. ~~Leather~~ markings (see [figure 9-11](#)) on ~~uncoated~~ side of patch using black waterproof ink.

Materials Required

Quantity	Description	Reference Number
8 x 5 inches	Cloth, Nylon, Var. C, Rubber-Coated, Orange	MIL-C-23070 NIIN 00-926-6489
As Required	Ink, Black Waterproof	SPE-92 NIIN 00-161-4229

Figure 9-10. Deleted

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NOTE

If replacing a worn or abraded International Morse Code patch, a new International Morse Code patch shall be cemented directly on top of old patch.

2. Mark a 8 x 5-inch area at location stated in table 9-3 and shown in figure 9-2.

NOTE

Cement applications shall be performed in accordance with paragraph 9-51.

3. Cement International Morse Code patch to marked area on liferaft so top is "up" and patch is readable from inside of raft.

9-57. RELOCATION OF RETAINING LINE INSTRUCTION TAG. To relocate retaining line instruction tag, proceed as follows:

Materials Required

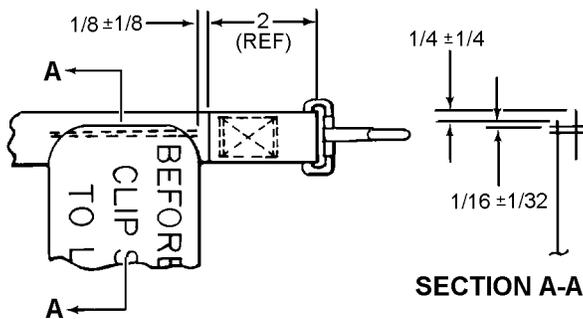
Quantity	Description	Reference Number
As Required	Thread, Nylon Type II, Size E	V-T-295 NIIN 00-204-3884

1. Remove the instruction tag from the snaphook.

NOTE

All stitching shall be done with size E thread, 6 to 10 stitches per inch.

2. Position instruction tag on retaining line and attach using two rows of stitches.



Step 2 - Para 9-57

10057002

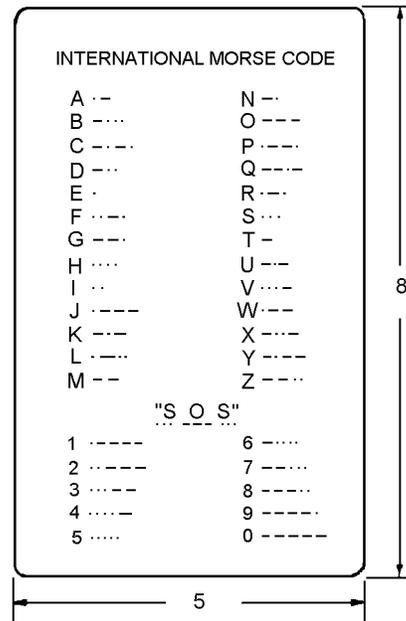


Figure 9-11. International Morse Code Patch

10090011

9-58. FABRICATION OF PAINTER LINE POUCH. Painter lines shall be installed on all multi-place liferafts. To fabricate the painter line pouch, proceed as follows:

Materials Required

Quantity	Description	Reference Number
5 x 20 inches	Leatherette, Class 2 or Herculite No. 80, Grey	CCC-A-700
53 inches	Tape, Pile, 3/4-inch	MIL-F-21840
41 inches	Tape, Hook, 3/4-inch	MIL-F-21840
As Required	Thread, Nylon, Type II, Size E	V-T-295 NIIN 00-204-3884

Materials Required (Cont)

Quantity	Description	Reference Number
1	Snaphook, Wire Body, Fixed Loop Eye, Flat Spring Closure, With Retainer	MIL-S-43770/1-CWBC1
60 feet	Cord, Nylon, Type I	MIL-C-5040 NIIN 00-240-2154

NOTE

All stitching shall be done with size E nylon thread (V-T-295, Type II), using 8 to 10 stitches per inch.

1. Cut and stitch hook and pile tape along edge of material. See figure 9-12.
2. Stitch two 9-inch lengths of hook tape 1 1/4 inch from sides. See figure 9-12.

NOTE

Stitch pile tape on one end only.

3. Position face up a 15-inch length of pile tape at inner end of each inside strip of hook tape. Secure inner end of each pile tape to material with double row of stitching. See figure 9-12.
4. Form 1/2-inch wide hesitator loops, 1/8 inch apart. Press hook and pile tape together between loops. See figure 9-13.
5. Stow painter line, making 3 1/2-inch bights, placing 8 folds in each hesitator loop. See figure 9-13.
6. Leave 24 inches of line unstowed at each end for securing painter line to liferaft and aircraft. See figure 9-13.
7. Fold material in half, forming pouch, and leave unstowed ends outside pouch. Press hook and pile tape together.

8. Attach snaphook to one end of unstowed painter line extending from open end of pouch with a bow-line knot.

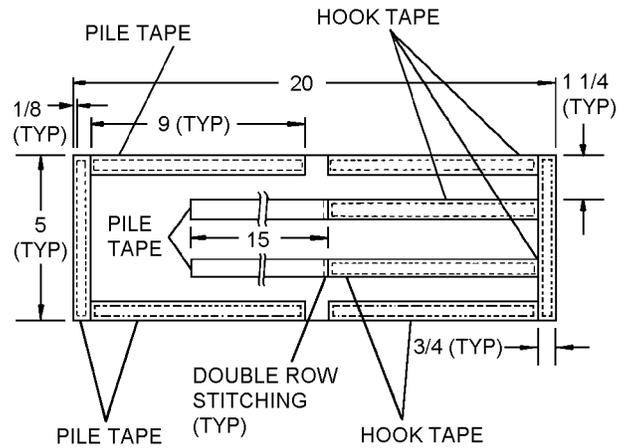


Figure 9-12. Painter Line Pouch

10090012

9-59. DRILLING HOLES IN P/N A128-RT-1. To drill holes in P/N A128-RT-1, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Drill, No. 52	—

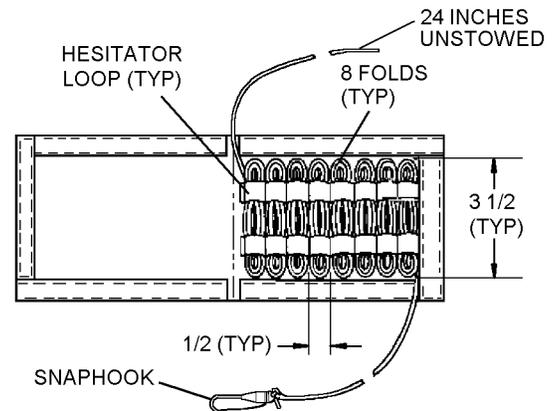
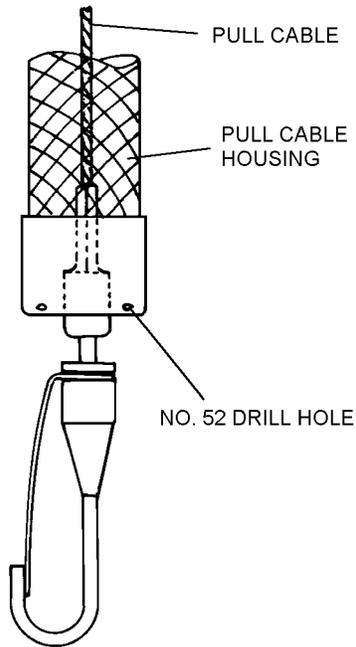


Figure 9-13. Stowed Painter Line

10090013

NAVAIR 13-1-6.1-1

1. Using a no. 52 drill, drill two holes in pull cable housing.



Step 1 - Para 9-59

10059001

2. Safety-wire pull cable housing in accordance with [paragraph 9-46](#).

9-60. DRILLING HOLES IN P/N IV0303 (VEE Mfg.) INFLATION VALVE. To drill holes in P/N IV0303 (VEE Mfg.) inflation valve, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Drill, No. 52	—

1. Disconnect inflation valve from manifold.
2. Remove cover plate and plastic dust shield from valve.
3. Using a no. 52 drill, drill two holes in cover plate and plastic dust shield. See [figure 9-14](#).
4. Remove cam screw from sheave assembly.

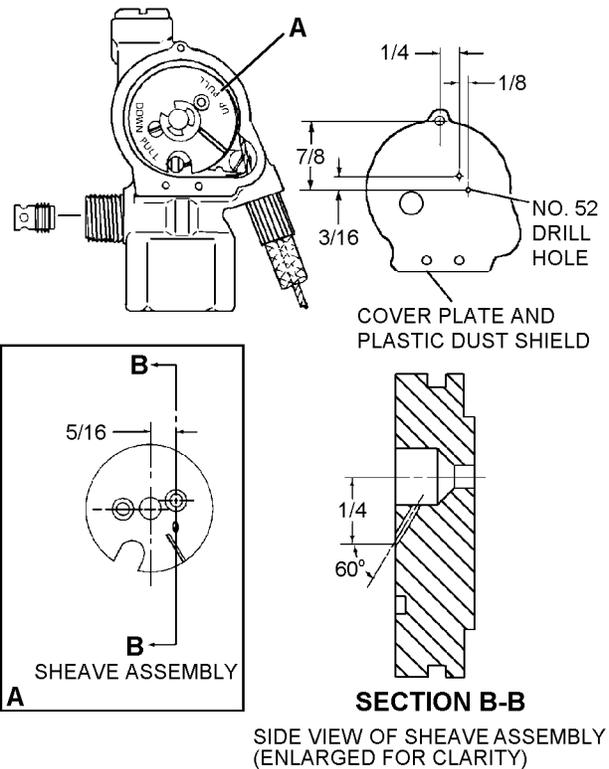


Figure 9-14. Drilling IV0303 Inflation Valve

10090014

WARNING

Care must be taken not to rotate cam.

5. Remove sheave assembly.
6. Carefully remove tru-arc ring from stem on valve body.
7. Remove valve sheave from valve body.
8. Using a no. 52 drill, drill a hole at a 60° angle in valve sheave. See [figure 9-14](#).

NOTE

Section line B-B through the center of the screwdriver slot and the center of the screw hole. A starter hole will be necessary to seat the drill, prior to drilling the angled hole.

CAUTION

Valve cover plate is not interchangeable between manufacturers.

9. Install valve sheave, tru-arc ring, release cable, cam screw, plastic dust shield, and cover plate. See [paragraph 9-46](#) for proper safety-wiring.

10. Connect inflation valve to manifold.

9-61. DRILLING HOLES IN P/N A128 INFLATION VALVE. To drill holes in P/N A128 inflation valve, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Drill, No. 52	—

1. Disconnect inflation valve from manifold.

2. Remove cover plate from valve.

3. Using a no. 52 drill, drill two holes in cover plate. See [figure 9-15](#).

4. Remove release cable from around valve.

WARNING

Do not rotate cam or depress poppet stem.

5. Remove valve sheave from valve.

6. Using a no. 52 drill, drill a hole at a 23° angle in the valve sheave. See [figure 9-15](#).

7. Install valve sheave, cable, and cover plate. See [paragraph 9-46](#) for proper safety-wiring.

8. Connect the inflation valve to manifold.

9-62. DRILLING HOLES IN P/N 871444 INFLATION VALVE. To drill holes in part number 871444 inflation valve, proceed as follows:

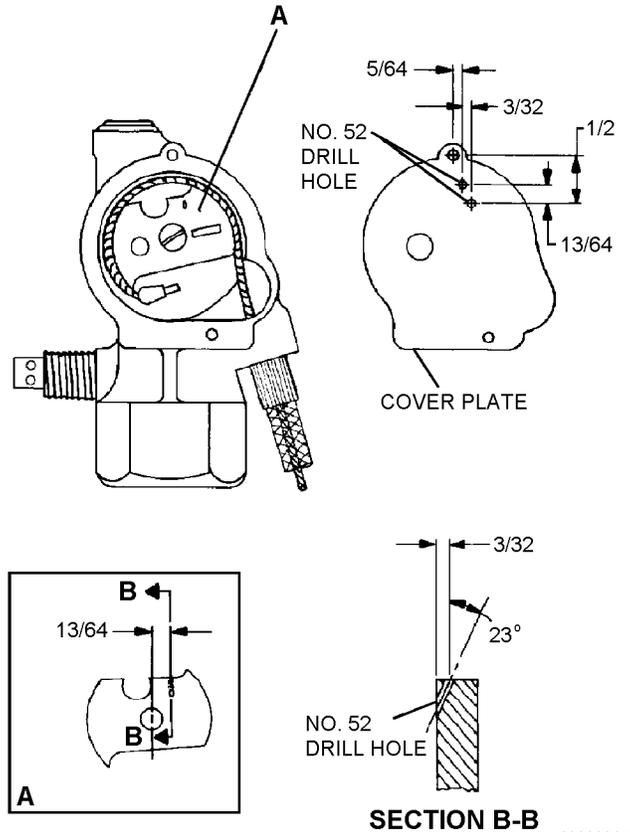


Figure 9-15. Drilling A128 Inflation Valve

10090015

Support Equipment Required

Quantity	Description	Reference Number
1	Drill, No. 52	—

1. Disconnect inflation valve from manifold.

2. Remove cover plate from valve.

NOTE

Position of holes in cover plate depends on type of pull used (up-pull or down-pull).

Position of holes depends on type of pull used (up-pull or down-pull).

3. Using a no. 52 drill, drill two holes in cover plate. See [figure 9-16](#).

NAVAIR 13-1-6.1-1

4. Remove release cable from around valve sheave.

WARNING

Do not rotate cam or depress poppet stem.

5. Remove valve sheave from valve.

6. Using a no. 52 drill, drill a hole at an 18° angle in valve sheave. See [figure 9-16](#).

7. Install valve sheave, cable and cover plate. See [paragraph 9-46](#) for proper safety-wiring.

8. Connect inflation valve to manifold.

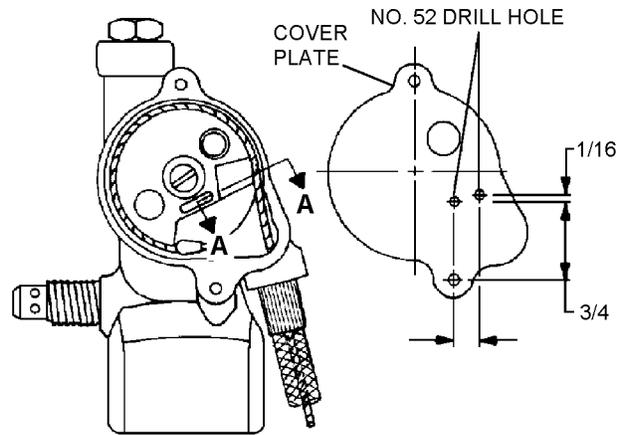
9-63. FABRICATION OF CYLINDER VALVE ANTI-CHAFING SLEEVE. To fabricate a cylinder valve antichafing sleeve, proceed as follows:

Materials Required

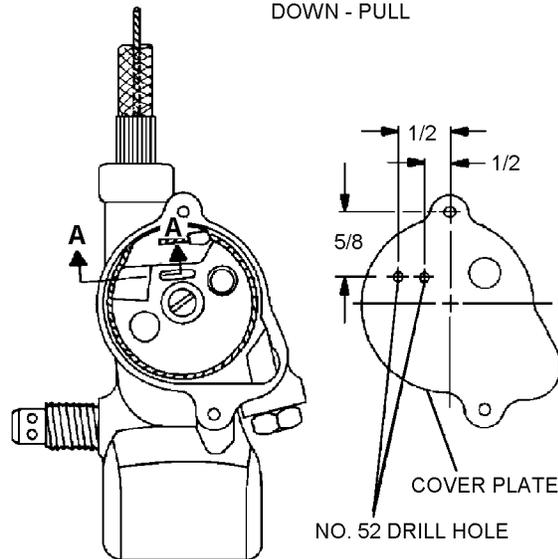
Quantity	Description	Reference Number
16 1/2 x 8 1/2 inches	Cloth, Laminated Var. D, Blue	MIL-C-23070 NIIN 00-132-5009
	-or-	
	Cloth, Laminated Var. C, Orange	MIL-C-23070 NIIN 00-081-5829
	-or-	
1	Cloth, Laminated Var. C, Yellow	MIL-C-23070 NIIN 00-926-6489
	Punch, Cutting, Type I, Class B, Style 1, Size 13	GGG-P-833A NIIN 00-180-0927
As Required	Thread, Nylon, Type II, Size E	V-T-295 NIIN 00-204-3884

NOTE

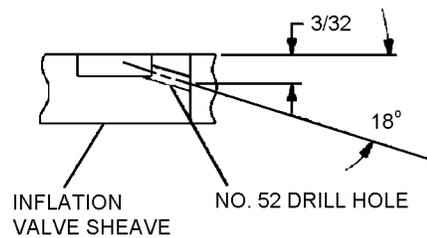
All stitching shall be done with size E thread, 6 to 10 stitches per inch.



DOWN - PULL



UP - PULL

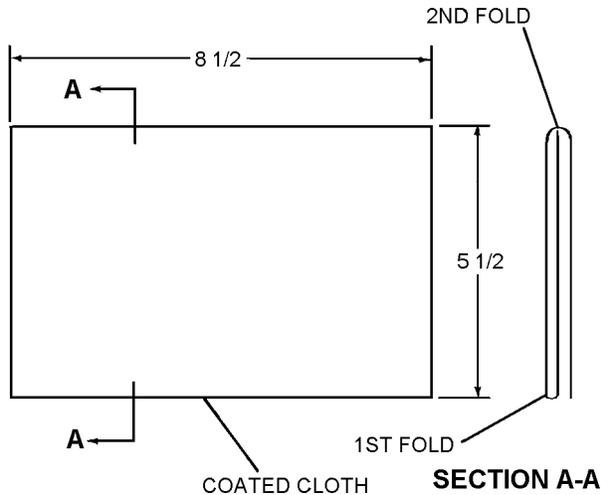


SECTION A-A

Figure 9-16. Drilling 871444 Inflation Valve

10090016

1. Make two folds in the nylon rubber-coated cloth, each fold being 5 1/2 inches as shown.

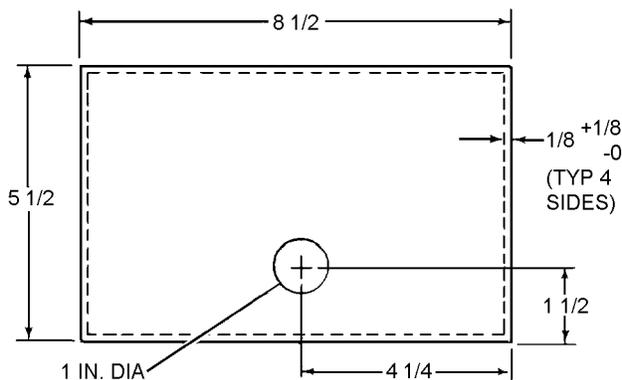


Step 1 - Para 9-63

I0063001

2. Sew a 1/8-inch inboard border row of stitching around the perimeter of the assembly.

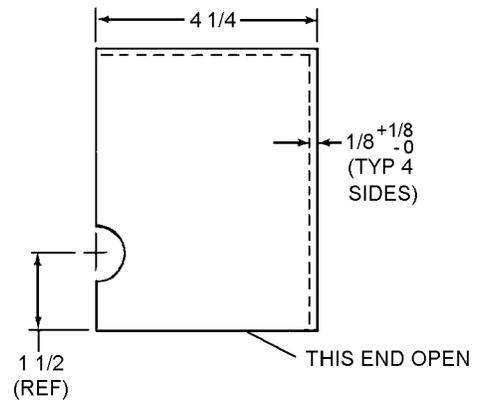
3. Position assembly on cutting board and punch a 1-inch diameter hole through all three layers of material.



Step 3 - Para 9-63

I0063003

4. Fold assembly in half and sew a 1/8-inch row of stitching inboard from edge on end and side.



Step 4 - Para 9-63

I0063004

9-64. FABRICATION OF 10-FOOT RETAINING LINE. To fabricate a 10-foot retaining line, proceed as follows (see figure 9-17):

Materials Required

Quantity	Description	Reference Number
10 feet 4 1/2 inches	Webbing, Nylon, Type II, 1 inch	MIL-W-4088 NIIN 00-262-1643
As Required	Thread, Nylon, Type II, Size E	V-T-295 NIIN 00-204-3884
1	Snaphook	M43770/1-CWBC3

1. Using dimensions shown, pass one end of nylon webbing through snaphook and boxstitch.

2. Using dimensions shown, fold opposite end over and boxstitch, forming a loop.

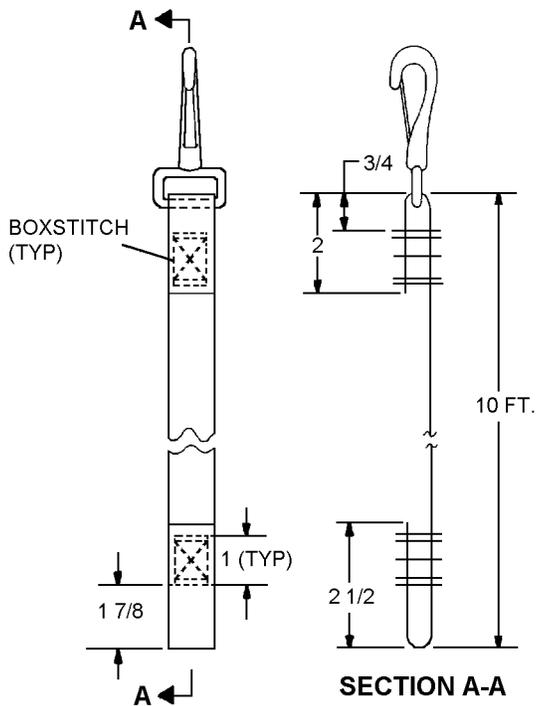


Figure 9-17. 10-Foot Retaining Line

10090017

9-65. FABRICATION OF BOARDING HANDLE ASSEMBLY. To fabricate a boarding handle assembly, proceed as follows:

Materials Required

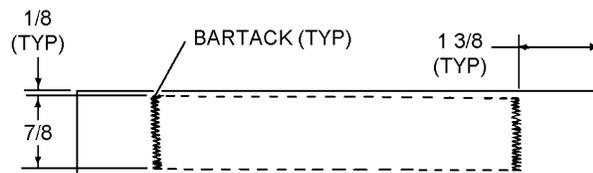
Quantity	Description	Reference Number
As Required	Tape, Nylon, Type II, 1 inch	MIL-T-5038
As Required	Thread, Nylon, Type II, Size E	V-T-295 NIIN 00-204-3884

Materials Required (Cont)

Quantity	Description	Reference Number
1	Disposable Brush	NIIN 00-514-2417
As Required	Cloth, Laminated, Var. C, Orange	MIL-C-23070 NIIN 00-081-5829
	-or-	
	Cloth, Laminated, Var. D, Blue	MIL-C-23070 NIIN 00-132-5009
	-or-	
	Cloth, Laminated, Var. C, Yellow	MIL-C-23070 NIIN 00-926-6489

1. Sear-cut two 12-inch pieces of nylon tape for handle.

2. Stitch the two 12-inch lengths of nylon tape together, using 6 to 10 stitches per inch, leaving a space of 1 3/8 inches from each end. Sew in a 7/8-inch bartack 1 3/8 inches from each end.

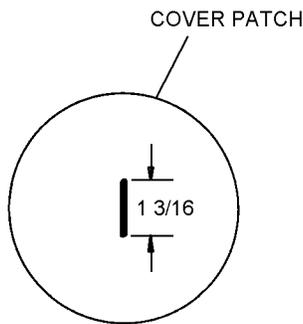


Step 2 - Para 9-65

10065002

3. Cut two 5-inch diameter discs for the cover patch and two 3-inch diameter discs for the base patch from orange nylon liferaft cloth.

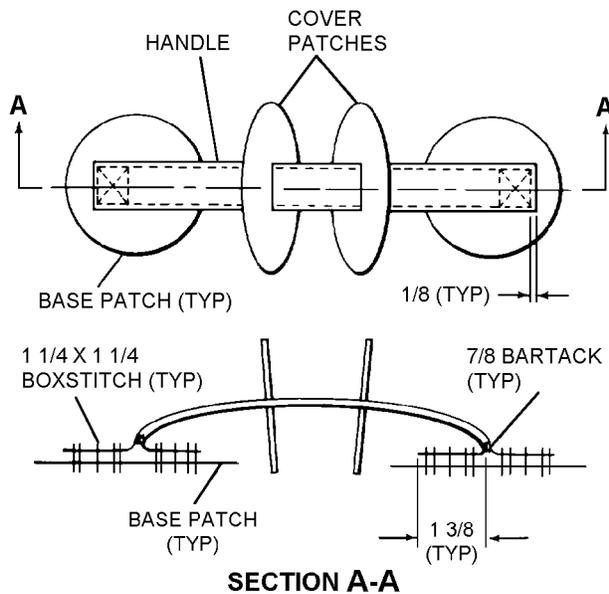
4. On centerline of the two 5 inch diameter cover patches make a slit 1 3/16 inches in length.



Step 4 - Para 9-65

I0065004

5. Insert handle through slit in each cover patch.
6. Separate ends of handle and stitch to each base patch.



Step 6 - Para 9-65

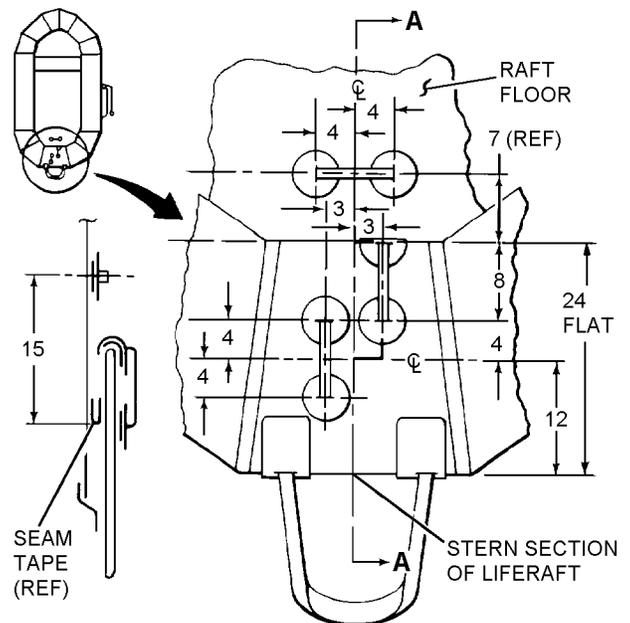
I0065006

NOTE

Cement applications shall be performed accordance with paragraph 9-51.

7. Cement boarding handle cover patches to their respective base patches.

8. Position boarding handle on liferaft and cement in place.



SECTION A-A

Step 8 - Para 9-65

I0065008

9. Dust area with talc.

9-66. FABRICATION OF BOARDING STIRRUP ASSEMBLY. To fabricated boarding stirrup assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Webbing, Nylon, Type XII, 1 23/32 inches	MIL-W-4088
As Required	Thread, Nylon, Type II, Size E	V-T-295 NIIN 00-204-3884

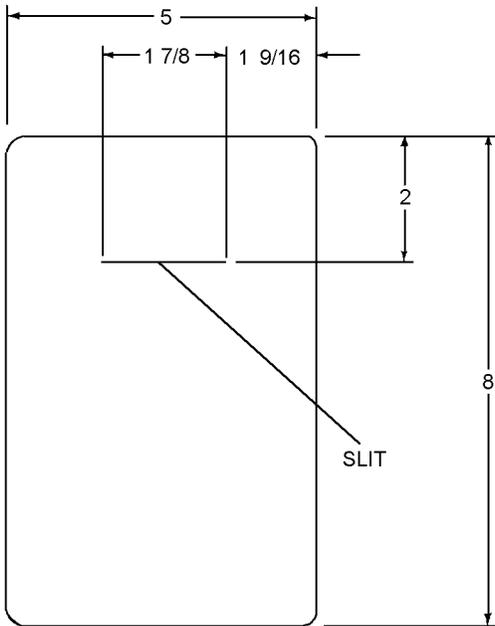
NAVAIR 13-1-6.1-1

Materials Required (Cont)

Quantity	Description	Reference Number
As Required	Cloth, Laminated, Var. C, Orange	MIL-C-23070 NIIN 00-081-5829
	-or-	
	Cloth, Laminated, Var. D, Blue	MIL-C-23070 NIIN 00-132-5009
As Required	-or-	
	Cloth, Laminated, Var. C, Yellow	MIL-C-23070 NIIN 926-6489

1. Cut two 8 x 5-inch cover patches and two 7 x 4-inch base patches from the orange nylon liferaft cloth.

2. Cut a 1 7/8-inch slit in each of the 8 x 5-inch cover patches.

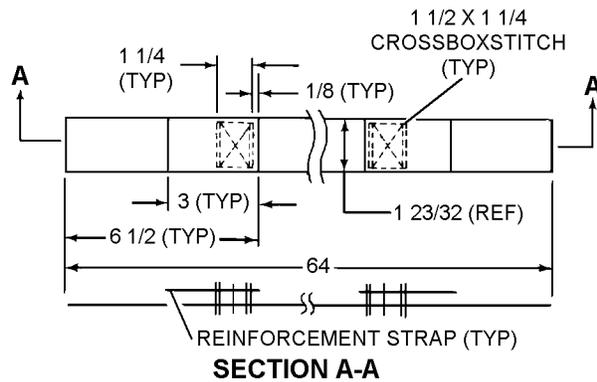


Step 2 - Para 9-66

10066002

3. Sear-cut two 3-inch lengths and one 64-inch length of nylon webbing.

4. Position and stitch 3-inch reinforcement strap with a 1 1/2 x 1 1/4-inch crossboxstitch pattern.



Step 4 - Para 9-66

10066004

5. Slip two 8 x 5-inch cover patches onto boarding stirrup strap and slide them out of the way.

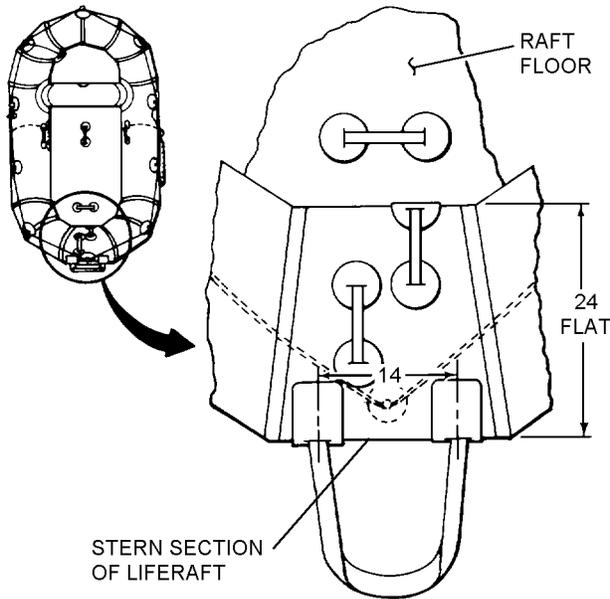
6. Stitch reinforcement strap to 7 x 4-inch base patch with a 1 1/2 x 3/4-inch boxstitch pattern. Stitch boarding stirrup strap to base-patch with a 1 1/2 x 4 3/4-inch crossboxstitch pattern. See figure 9-18.

NOTE

Cement applications shall be performed in accordance with paragraph 9-51.

7. Cement 8 x 5-inch cover patches to their respective base patches.

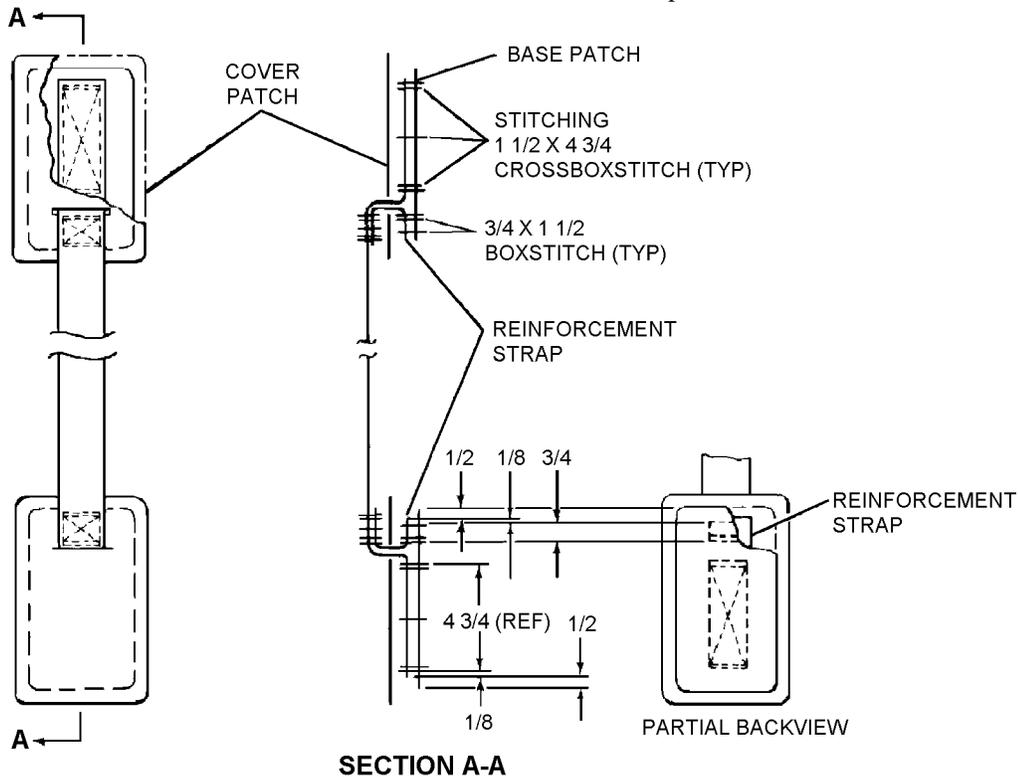
8. Position boarding stirrup assembly on liferaft and cement in place.



Step 8 - Para 9-66

10066008

9. Dust area with talc.



SECTION A-A

Figure 9-18. Fabrication of Boarding Stirrup Assembly

9-67. FABRICATION OF RIGHTING LINE. To fabricate the righting line, proceed as follows:

Materials Required

Quantity	Description	Reference Number
12 feet	Rope, Nylon, Type I, 3/4 inch Circumference, Natural Color	MIL-R-17343 NIIN 00-618-0261

1. Securely tie righting line to liferaft lifeline with a bowline knot on port side opposite manifold (midway between the two lifeline patches). See figure 9-2.

2. Tie two overhand knots, the first knot 1 foot from the free end and the second knot 1 foot from the first. The finished length of the knotted righting line shall be 10 feet 6 inches \pm 6 inches long. To avoid fraying, sear all cut edges. Do not form sharp edges.

9-68. REPLACEMENT OF TOPPING-OFF VALVE. To replace a damaged or corroded topping-off valve, proceed as follows:

10090018

NAVAIR 13-1-6.1-1

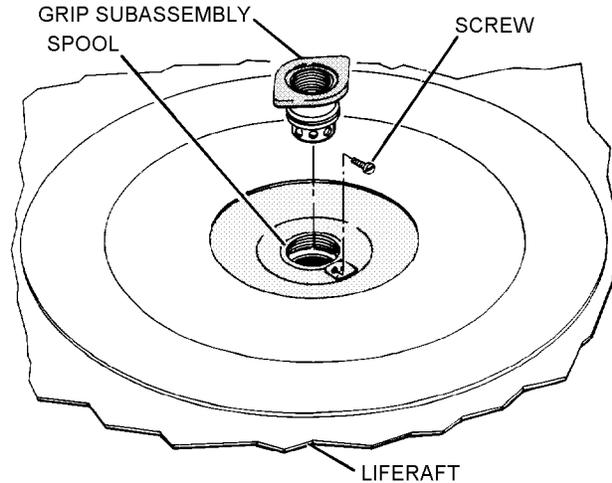
Materials Required

Quantity	Description	Reference Number
1	Grip Subassembly (See Note)	MS22054-3
1	Washer (See Note)	MS22054-7
1	Screw (See Note)	MS22054-9
As Required	Applicator, Wood, Cotton-tipped	GGA-616D
As Required	Toluene	TT-T-548 NIIN 00-281-2002
	-or-	
	Methyl Ethyl Ketone (MEK)	TT-M-261 NIIN 00-281-2762
As Required	Adhesive, Class 3, Polychloroprene	MIL-A-5540 NIIN 00-142-9913

Note: This component is part of parts kit, P/N 1106AS110-1 (CAGE 30003) NIIN 01-128-5331.

1. Ensure that grip subassembly is in closed position.

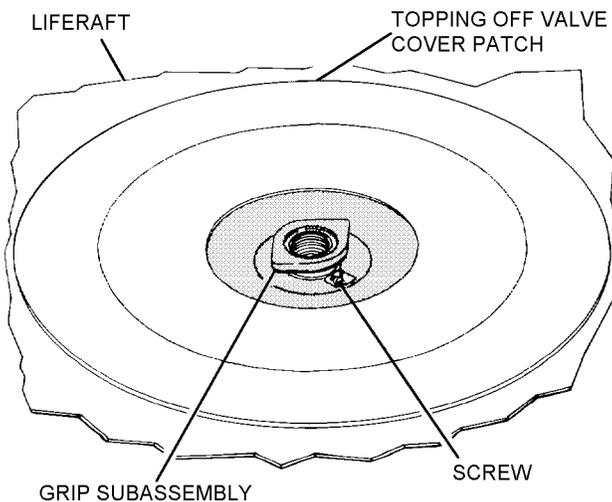
3. Remove screw from side of spool.



10068003

Step 3 - Para 9-68

4. Unscrew and remove grip subassembly from spool.



10068001

Step 1 - Para 9-68

2. Turn grip subassembly clockwise approximately 1 1/2 turns.

WARNING

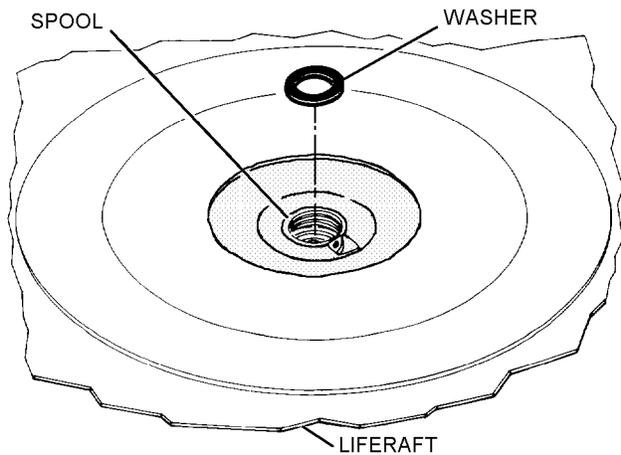
Do not use toluene or MEK near open flame, heat or electrical sparks. Avoid prolonged contact with skin or breathing of fumes. Use only in well-ventilated area.

CAUTION

To avoid damaging valve threads, care should be taken when inserting instrument to remove washer.

Use only enough toluene to loosen washer. Ensure that no toluene or MEK passes through bottom of valve opening. Wipe excess from liferaft as rapidly as possible.

5. Remove washer located in bottom of spool. If necessary, use toluene or MEK to assist in removal.



Step 5 - Para 9-68

10068005

NOTE

Ensure that no toluene, MEK, or congealed masses of adhesive enter the opening at bottom of spool.

Toluene shall be the primary solvent used in the fabrication or repair of this assembly. MEK may be used if toluene is not available. Always use solvents sparingly and wipe up excess solvents; do not allow to dry by evaporation.

6. Insert an applicator or similar instrument dipped in toluene or MEK into spool and swab washer seating area to remove old adhesive.

7. Apply adhesive, using an applicator or similar instrument, to washer seating area on inside bottom of spool.

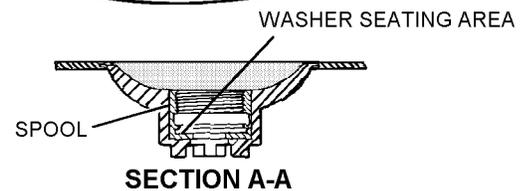
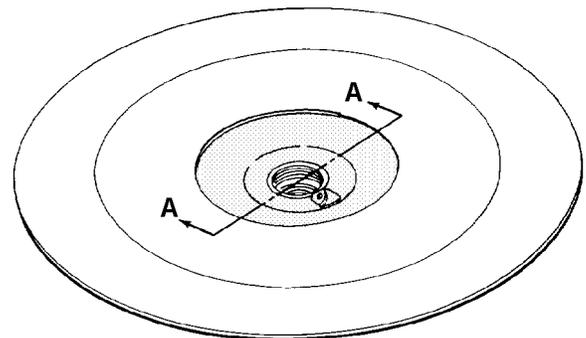


Do not use sharp instrument to insert washer into seating area.

NOTE

Ensure that the washer is properly seated on to bottom of spool and that the threads and opening are free of adhesive.

8. Insert washer into washer seating area.



Step 8 - Para 9-68

10068008

9. Screw grip subassembly counterclockwise into spool until it closes.

10. Turn grip subassembly clockwise approximately 1 1/2 turns.

11. Tighten screw into side of spool until snug.

12. Ensure proper operation of topping-off valve.

13. Perform leakage test in accordance with [paragraph 9-34](#).

9-69. REPAIR PROCEDURES FOR CARRYING CASE AND HANDLES. To repair the carrying case and case handles, proceed as follows:

NAVAIR 13-1-6.1-1

Materials Required

Quantity	Description	Reference Number
As Required	Webbing, Nylon, Type I, 1 1/2 inches wide	MIL-W-21733 (Optional matl. MIL-W-17337)
As Required	Cloth Laminated Var. C, Orange	MIL-C-23070 NIIN 00-081-5829
As Required	Thread, Nylon, Type II, Size E	V-T-295 NIIN 00-204-3884

1. Handle Repair.

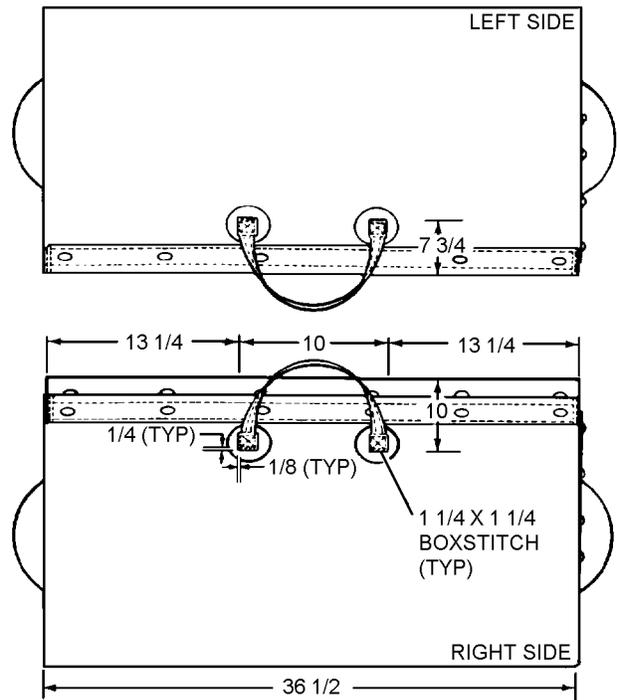
a. Cut eight 3 1/2-inch diameter circles from laminated cloth (MIL-C-23070).

b. Stitch cloth circles in place on inner and outer sides of carrying case with centers 14 3/4 inches from outside seam edge and 8 3/4 inches down from top seam edge on right side; 6 1/2 inches down from top seam edge on left side.

c. Cut two 21-inch lengths of nylon webbing, 1 1/2 inches wide (MIL-W-21733).

d. On each length, fold 1/4 inch of material under on both sides commencing 2 3/8 inches from end and continuing for 16 1/4 inches. Stitch in place.

outboard edge of handles 13 1/4 inches from outside seam edge and 10 inches apart; bottom edge of handles 10 inches down from top seam on right side and 7 3/4 inches down from top seam edge on left side. Use 1 1/4 x 1 1/4-inch boxstitch.



0906901e

Step 1e - Para 9-69

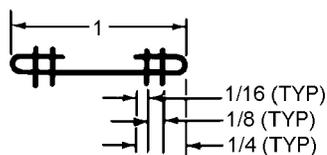
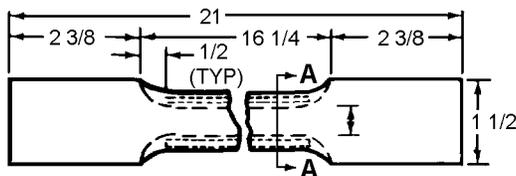
2. Carrying Case Repair.

a. Tears of less than 1 inch shall be darned or repaired with a zigzag stitch.

b. Tears of 1 to 6 inches shall be covered with a patch.

c. Broken stitching shall be repaired by over-stitching 2 inches past the ends of the broken stitches and shall be back-stitched one inch.

d. Tears of over 6 inches shall not be repaired.



SECTION A-A

Step 1d - Para 9-69

0906901d

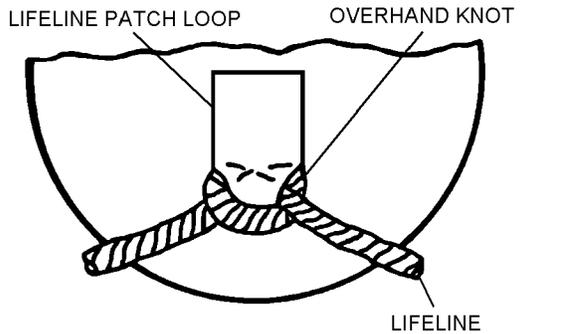
e. Stitch handle ends in vertical position on sides of case on top of reinforcement circles, with

9-70. REPLACEMENT/REPAIR OF LIFELINE. To replace or repair the lifeline on the liferaft proceed as follows:

Materials Required

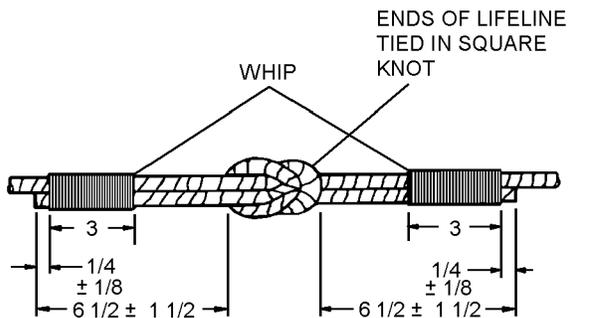
Quantity	Description	Reference Number
As Required	Rope, Nylon, 3/4 inch circumference, Natural Color	MIL-R-17343 NIIN 00-618-0261
As Required	Thread, Nylon Type II, Size E	V-T-295 NIIN 00-204-3884

1. Inflate raft to test pressure.
2. Carefully remove damaged lifeline from all lifeline patch loops (overhand knot) and from righting line (bowline knot).
3. Thread nylon cord through all lifeline patch loops, tying an overhand knot around each loop. Leave 2 inches \pm 1 inch slack in lifeline between each lifeline patch loop.



Step 3 - Para 9-70

4. Secure ends of lifeline with a square knot midway between lifeline patch loops leaving 6 1/2 inches \pm 1 1/2 inches on each end of lifeline outside of knot.
5. Wrap (whip) the last 3 inches of 6 1/2 inch loose ends with Type II size E nylon thread to secured lifeline. A length of 1/4 inch \pm 1/8 inch of bitter end will extend beyond the whip.



Steps 4 and 5 - Para 9-70

6. Secure righting line to lifeline with bowline knot (Refer to [paragraph 9-67](#)).

9-71. REPLACEMENT OF LIFERAFT HEAVING LINE. To replace liferaft heaving line proceed as follows:

Materials Required

Quantity	Description	Reference Number
75 feet	Cord, Nylon, Coreless Type I, 400 lb Test	MIL-C-7515

1. If required, untie bowline knot and remove defective heaving line from attachment loop in heaving line pocket on main tube of liferaft.
2. Using bowline knot secure one end of replacement line to attachment loop in heaving line pocket.
3. Secure heaving line grommet to opposite end of heaving line using bowline knot.
4. Fake heaving line on flat surface using into 13-inch bights. Gather the line and place rubberband around each end one to two inches from end of bights.
5. Place heaving line in heaving line pocket under grommet. Close pocket and secure snaps.

9-72. REPLACEMENT OF LOCKING CONES (LIFERAFT CASES). To replace damaged locking cones on liferaft cases, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Nylon 3-Cord	V-T-295
As Required	Cone, Locking	NIIN 00-095-0075-LX

1. Cut and remove tacking holding damaged cone to life raft case. Remove damaged cone.

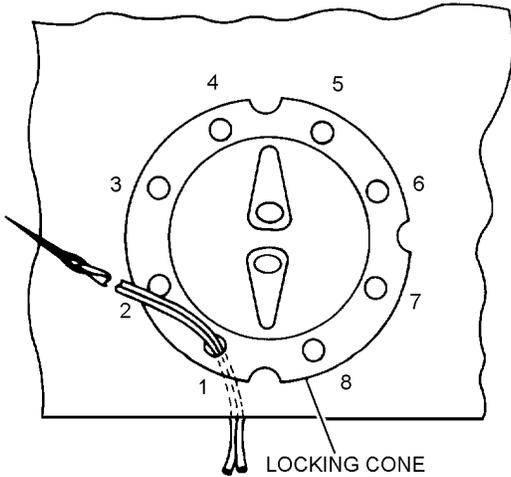
NOTE

If fabric supporting locking cone is damaged, fabricate and install a reinforcing patch on inside of case.

2. Position new locking cone in exact location of damaged or missing cone. Ensure locking pin hole in apex of cone is properly aligned.

NAVAIR 13-1-6.1-1

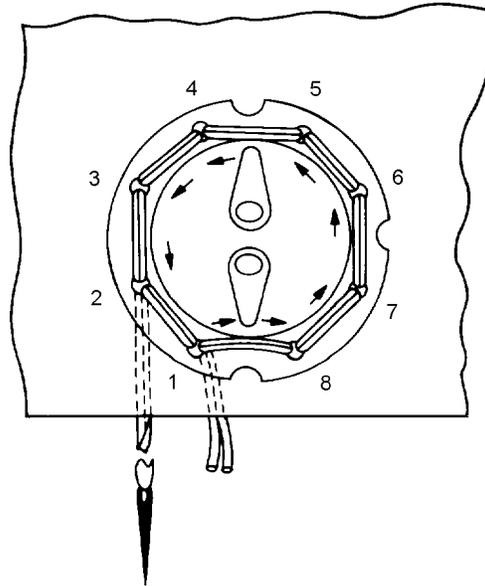
3. Push needle, threaded with waxed nylon 3-cord (V-T-295) doubled, up through panel and through hole 1 in locking cone. Pull needle and thread through hole until approximately three inches of thread remains on underside of panel.



Step 3 - Para 9-72

I0072003

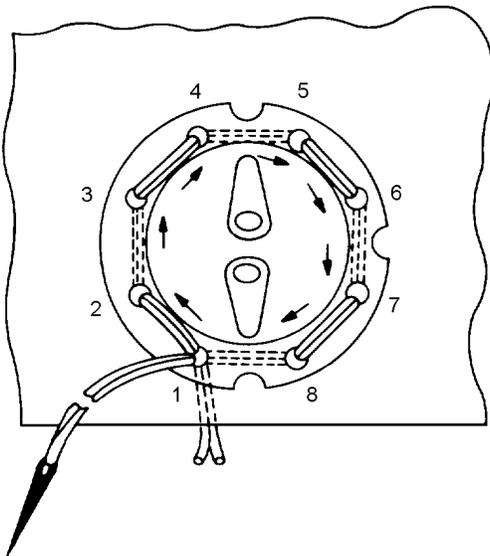
5. Working counterclockwise, pass needle down through hole 8, up through hole 7. Continue until needle passes down through hole 2. Take up all slack in thread.



Step 5 - Para 9-72

I0072005

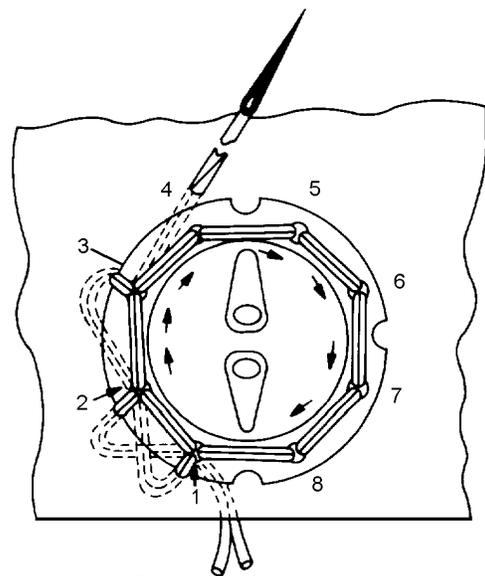
4. Working clockwise, pass needle down through hole 2, up through hole 3. Continue until all holes are threaded, and needle passes up through hole 1. Take up all slack in thread.



Step 4 - Para 9-72

I0072004

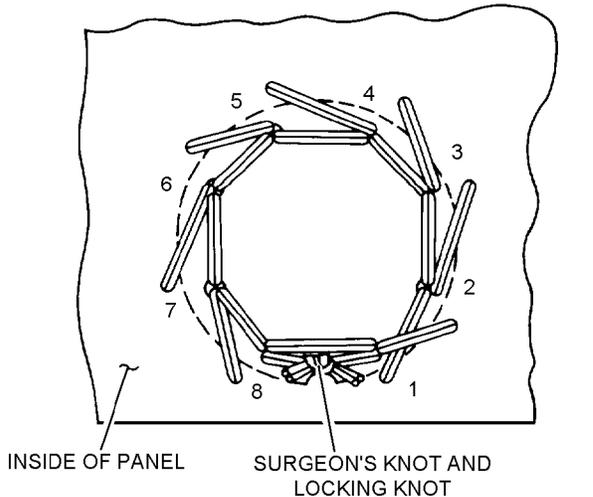
6. Pass needle up through panel at outside edge of cone directly adjacent to hole 1. Working clockwise, pass needle down through hole 1 and up through panel adjacent to hole 2, then down through hole 2. Continue stitching in this manner until needle passes down through hole 8. Take up all slack in thread.



Step 6 - Para 9-72

I0072006

7. Tie ends of thread on inside of panel with surgeon's knot followed by a square knot. Trim thread ends 1/4 inch from knot.



Step 7 - Para 9-72

10072007

9-73. PACKING LRU-13/A LIFERAFT.

9-74. The LRU-13/A liferaft assembly may be packed in droppable configurations (hand-launched) for down-pull or installation into aircraft nacelle or fuselage liferaft compartments. The method used depends upon aircraft application. The LRU-13/A shall be packed by qualified personnel at the lowest level of maintenance possible. Cleaning and servicing instructions can be found in [paragraph 9-38](#).

9-75. PACKING PROCEDURE FOR LRU-13/A LIFE-RAFT (DROPPABLE). To pack an LRU-13/A liferaft assembly (droppable, hand-launched), proceed as follows:

1. Ensure that liferaft, carrying case, and accessory container have been inspected in accordance with [paragraph 9-13](#).

2. Ensure that survival items and liferaft accessories have been inspected for expiration and damage. Refer to [table 9-5](#) for items used.

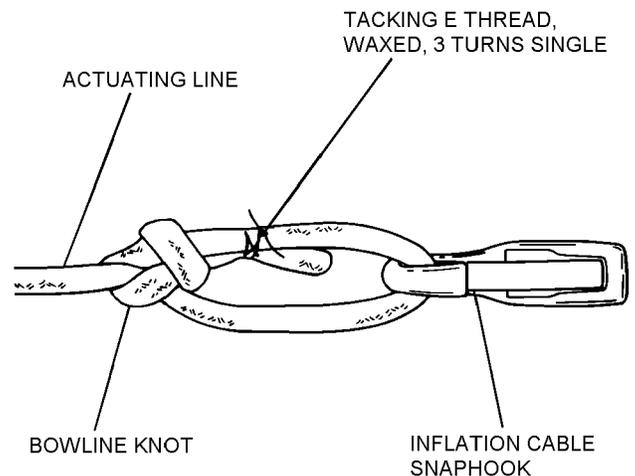
NOTE

NAVAIR 13-1-6.5 contains information on inspection/replacement and modification to the survival items.

3. Wrap breakable survival items with either rubber-coated cloth or cushioning wrap (NIIN 00-142-9008) and secure with rubber bands. Stow accessories and survival items in accessory container and supply pocket. Tie hand pump, installed radio(s), and Manual Reverse Osmosis Desalinator (MROD) to accessory container grommet with a 48-inch length of Type III nylon cord. Ensure that a bowline knot is applied.

4. Ensure that inflation valve is routed for down-pull, see [figure 9-9](#).

5. Attach 34-inch actuating line (MIL-C-5040 Type III nylon cord) to inflation assembly snaphook with a bowline knot. Tack with three turns of waxed size E nylon thread, single. Tie off tacking with a surgeon's knot followed by a square knot.



Step 5 - Para 9-75

10075005

WARNING

Wrap only the snaphook. If tape extends beyond snaphook to the pullcable housing, it could prevent actuation of the liferaft inflation assembly.

6. Wrap pull cable snaphook with a layer of wide paper tape to prevent snaphook from hanging up inside carrying case after connection.

7. Attach retaining line to neck of CO₂ cylinder with a lark's head knot.

8. Ensure that cylinder valve antichafing sleeve is installed.

9. Fake retaining line, righting line, and sea anchor mooring line, and secure with rubber bands.

10. If heaving lines are installed, stow heaving lines in heaving line pockets as follows:

a. Secure the loose end of the heaving line to the loop in the bottom of the heaving line pocket with a bowline knot.

b. Remove all twists and tangles from heaving line and grommet.

c. Fake the heaving line in 11 to 13-inch bights on a flat surface starting 12 to 15 inches from the loop in the bottom of the heaving line pocket.

d. Continue faking until 15 to 21 inches of line remains, measured from last bight of line to the grommet.

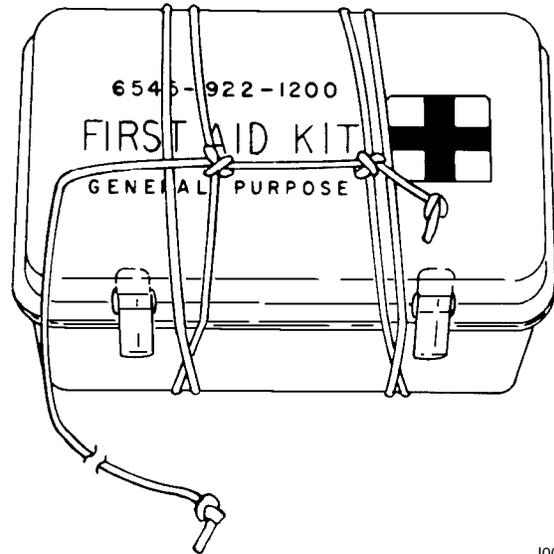
e. Gather the heaving line and place a doubled 2-inch diameter rubber band over the heaving line 1 to 2 inches from each end of the bights.

f. Place the heaving line under the grommet in the heaving line pocket and close the pocket.

11. Ensure that all topping-off valves are closed and liferaft is completely deflated.

12. Secure latches on first aid kit with several layers of pressure-sensitive tape (NIIN 00-266-5016).

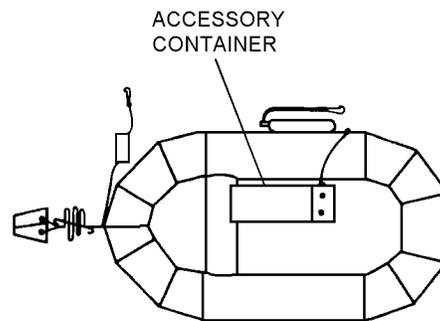
Using an 8-foot length of Type III nylon cord, tie an overhand knot in both ends. Wrap one end of cord two turns twice around the first aid kit on the inside of the kit latches and tie with a surgeon's knot. Route opposite end of cord to accessory container grommet and secure with a bowline knot. Stow first aid kit in accessory container.



10075012

Step 12 - Para 9-75

13. Stow accessory container in liferaft using a 10-foot length of Type III nylon cord, tie to nearest lifeline loop located next to CO₂ cylinder with a bowline knot.



10075013

Step 13 - Para 9-75

14. Secure supply pocket to mating snap fasteners on raft bulkhead. Ensure slider pull tab on supply pocket is tied to nearest lifeline loop with a 60-inch length of Type III nylon cord using bowline knots on both ends.

NOTE

Painter lines shall be installed on all multi-place liferafts. The painter line shall be a 60-foot length of Nylon cord, Type I, MIL-C-5040, NIIN 00-240-2154. The painter line retains a deployed liferaft to the aircraft during emergency egress and is designed to break under a 100-pound pull if the aircraft sinks.

15. Stow painter line in painter line pouch by forming eight 3 1/2-inch bights in line; then inserting each bight in eight hesitator loops provided. Leave 30 inches of unstowed painter line at each end of pouch. See [figure 9-19](#). Close pouch; then secure with hook and pile tape provided.

16. Attach snaphook to end of unstowed painter line extending from open end of pouch with a bowline knot. See [figure 9-19](#).

17. Attach end of painter line without snaphook to the sea anchor mooring patch loop with a bowline knot.

18. Dust entire liferaft lightly with talc (MIL-T-50036A).

WARNING

To prevent malfunction during inflation, ensure that no lifeline, sea anchor mooring line, righting line, painter line, or retaining line entangles or loops liferaft hardware during folding and packing procedures.

19. Fold liferaft in accordance with [figure 9-20](#). Ensure that sea anchor is placed on top of folded liferaft and actuating cord extends from folded liferaft.

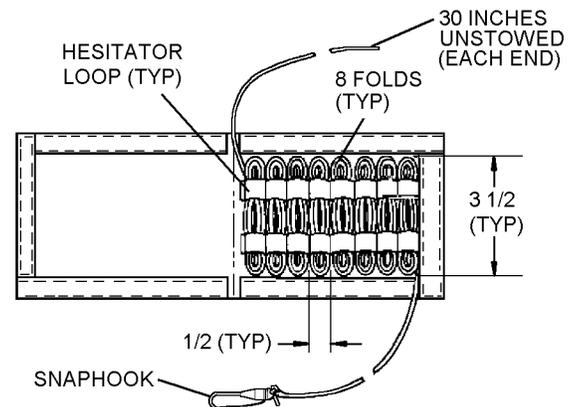


Figure 9-19. Stowed Painter Line

10090019

NOTE

Make a 30-inch center fold when the subject liferaft is packed in a 31-inch carrying case. Make a 35-inch center fold when the subject liferaft is packed in a 36-inch carrying case.

20. Insert rolled liferaft into carrying case so that pulled cable housing and attached actuation line are positioned toward carrying case ripcord handle end flap.

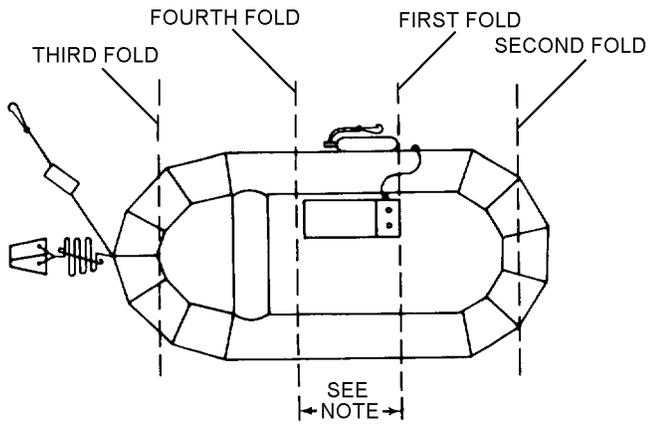
21. Stow painter line pouch behind carrying case end flap opposite from ripcord handle end of container; then attach painter line snaphook to end flap carrying handle.

NOTE

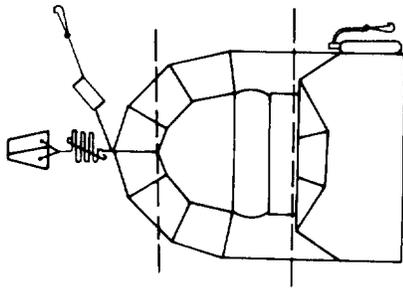
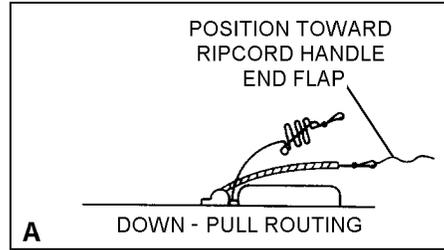
Painter line snaphook shall be attached temporarily to the end flap carrying handle opposite from ripcord end of container. This will provide for easy access to the painter line snaphook for attachment to aircraft.

22. Secure snap fasteners along length of carrying case.

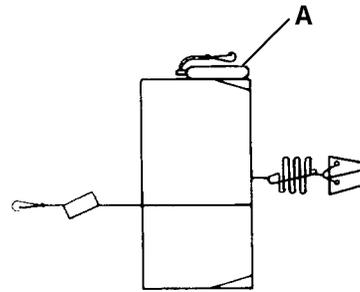
23. Tie free end of actuating line to ripcord cable loop with a bowline knot. Tack with three turns of waxed size E nylon thread, single. Tie off tacking with a surgeon's knot followed by a square knot. See [figure 9-20](#).



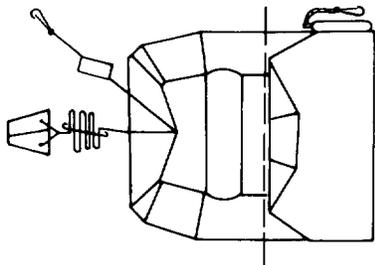
1. RAFT DEFLATED



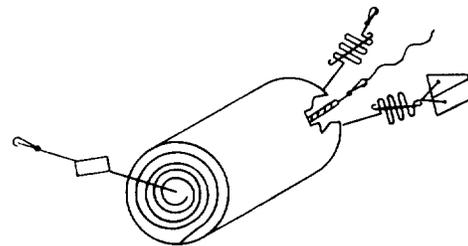
2. FIRST AND SECOND FOLD



4. FOURTH FOLD



3. THIRD FOLD

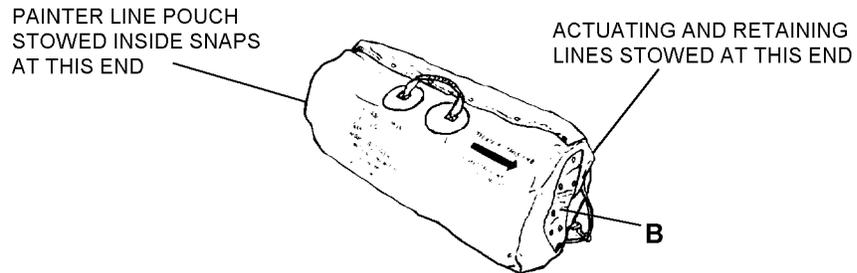


5. RAFT ROLLED (DOWN - PULL)

NOTE:

CARRYING CASE	CENTERFOLD
31 INCHES	30 INCHES
36 INCHES	35 INCHES

Figure 9-20. LRU-13/A Folding Procedure - (Droppable) (Sheet 1 of 2)



6. RAFT PACKED IN A 36 INCH CARRYING CASE

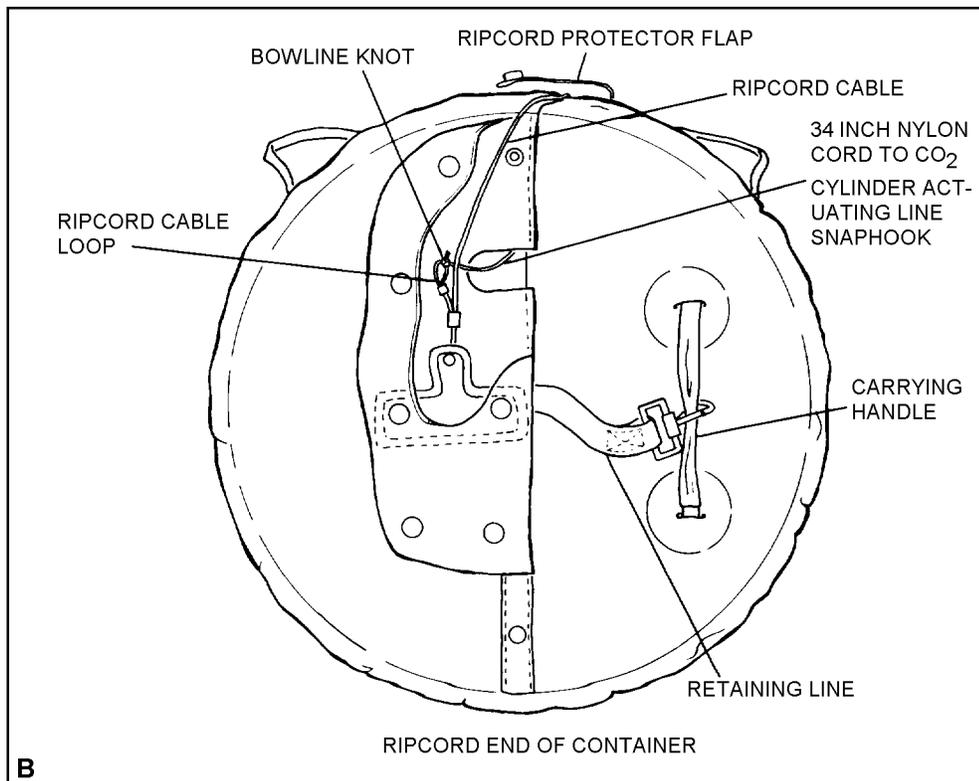


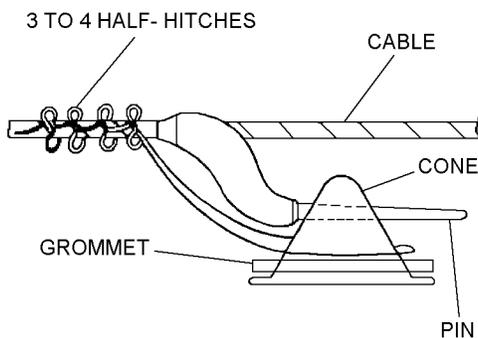
Figure 9-20. LRU-13/A Folding Procedure - (Droppable) (Sheet 2 of 2)

1009B020

NAVAIR 13-1-6.1-1

24. Attach retaining line snaphook to end flap carrying handle on ripcord handle end of container. Snap container closed. See [figure 9-20](#).

25. Install ripcord and safety-tie first and last ripcord pin by passing a 12-inch length of size E nylon thread (V-T-295), single, under ripcord pin. Secure thread to ripcord cable with three or four half-hitches.



Step 25 - Para 9-75

10075025

CAUTION

To prevent pull cable housing breakage, do not stow or store liferaft pack on ripcord handle end of pack.

26. Snap ripcord protector flap closed, position ripcord handle under carrying case end flap, and snap end flap closed. See [step 6](#), [figure 9-20](#).

27. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 Series.

9-76. PACKING PROCEDURE FOR LRU-13/A LIFERAFT ASSEMBLY (EXTERNAL RAFT COMPARTMENT). To pack an LRU-13/A liferaft assembly for external liferaft compartment installation, proceed as follows:

NOTE

The emergency equipment container (P/N 62A82D8-1, NIIN 00-552-9132) is no longer required for survival item stowage. The emergency equipment container, packed with styrofoam or other material, or an equivalent dummy pack, shall be stowed with the liferaft in the compartment to prevent liferaft movement and inadvertent inflation.

1. Ensure that liferaft carrying case (if applicable), and accessory container have been inspected in accordance with [paragraph 9-13](#).

2. Ensure that survival items and liferaft accessories have been inspected for expiration and damage. Refer to [table 9-5](#) for items used.

NOTE

NAVAIR 13-1-6.5 contains information on inspection/replacement and modification to the survival items.

Cushioning wrap (air bubble type) (NIIN 00-142-9008) is a suitable substitute for the rubber-coated cloth used to wrap breakable survival items.

3. Wrap breakable survival items with rubber-coated cloth and secure with rubber bands. Stow survival items in accessory container and supply pocket. Tie hand pump and PRT-5 transmitter to accessory container grommet with a 48-inch length of Type III nylon cord. Ensure that a bowline knot is applied.

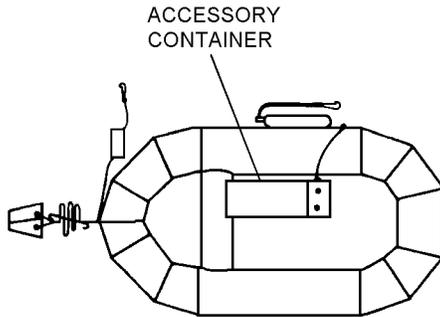
4. Fake righting line and sea anchor mooring line, and secure with rubber bands.

5. If heaving lines are installed, stow heaving lines in heaving line pockets ([paragraph 9-75, step 10](#)).

6. Ensure that all topping-off valves are closed and liferaft is completely deflated.

7. Secure latches on first aid kit with several layers of pressure-sensitive tape (NIIN 00-266-5016). Using an 8-foot length of Type III nylon cord, tie an overhand knot in both ends. Wrap one end of cord two turns twice around the first aid kit on the inside of the kit latches and tie with a surgeon's knot. Route opposite end of cord to accessory container grommet and secure with a bowline knot. Stow first aid kit in accessory container.

8. Tie accessory container to nearest lifeline loop located next to CO₂ cylinder with a bowline knot. Use a 10-foot length of Type III nylon cord.



Step 8 - Para 8-76

10075013

9. Secure supply pocket to mating snap fasteners on raft bulkhead. Ensure slider pull tab on supply pocket is tied to nearest lifeline loop with a 60-inch length of Type III nylon cord using bowline knots on both ends.

NOTE

All liferafts stowed in external liferaft compartments shall be secured to the aircraft with a painter line. The painter line shall be a 60-foot length of Nylon cord, Type I, MIL-C-5040, NIIN 00-240-2154. The painter line retains a deployed liferaft to the aircraft during emergency egress and is designed to break under a 100-pound pull if the aircraft sinks.

10. Stow painter line in painter line pouch by forming eight 3 1/2-inch bights in line and inserting each bight in eight hesitator loops provided. Leave 24 inches of unstowed painter line at each end of pouch. See figure 9-21. Close pouch; then secure with hook and pile tape provided.

11. Attach snaphook to end of unstowed painter line extending from open end of pouch with a bowline knot.

12. Attach end of painter line without snaphook to sea anchor mooring patch with a bowline knot.

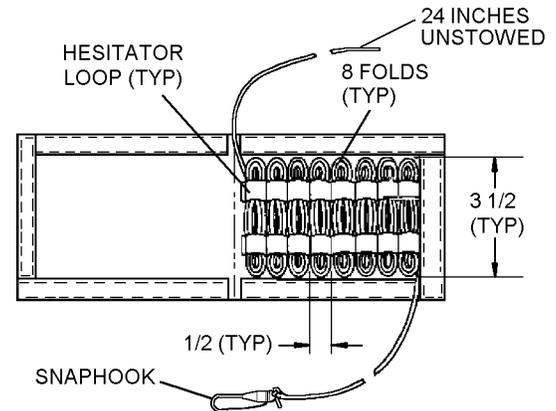


Figure 9-21. Stowed Painter Line

13. Dust entire liferaft assembly lightly with talc (MIL-T-50036A).



To prevent malfunction during inflation, ensure that no lifeline, sea anchor mooring line, righting line, painter line, or retaining line entangles or loops liferaft hardware during folding and packing procedures in accordance with the applicable aircraft maintenance manual.

14. Liferaft shall be folded in accordance with the applicable aircraft maintenance manual.

NOTE

When the LRU-13/A is used in C-2 nacelle compartments, an MS22049 carrying case (snap-type) is required; if none are available, a 62A82H601-1 carrying case shall be modified by replacing the locking cones and grommets with nondirectional snap fasteners.

All LRU-13/A liferafts installed in C-2 aircraft shall be packed for down-pull inflation.

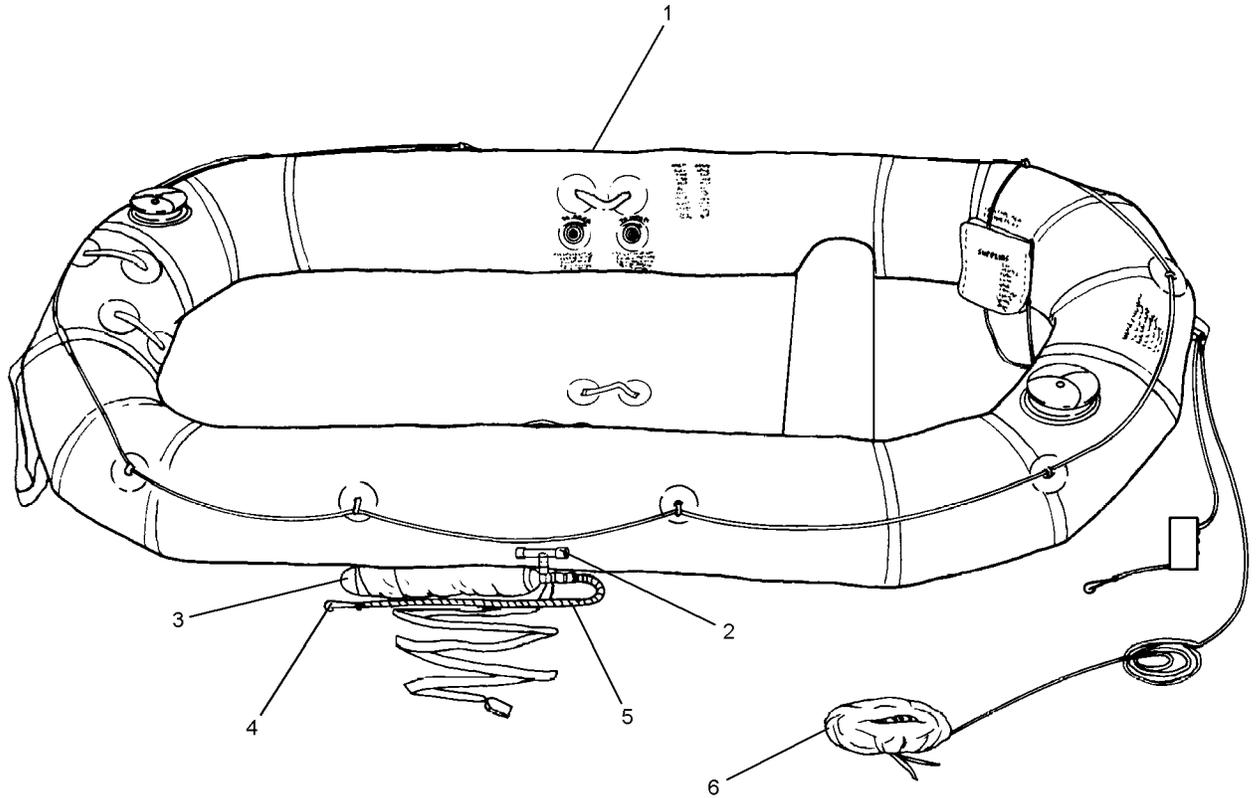
15. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 Series.

Section 9-4. Illustrated Parts Breakdown (IPB)

9-77. GENERAL.

9-78. This section lists and illustrates the assemblies and detail parts of the LRU-13/A Inflatable Seven-Man Liferaft.

9-79. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.



10090022

Figure 9-22. LRU-13/A Liferaft Illustrated Parts Breakdown

Figure and Index Number	Part Number	Description							Units Per Assembly	Usable On Code
		1	2	3	4	5	6	7		
9-22		LRU-13/A LIFERAFT ASSEMBLY (Note 5)							REF	
-1	62A82H2-101	. LIFERAFT, Seven-Man Inflatable (Note 1)							1	
-2	63A120H1-71	. . INFLATION VALVE ASSEMBLY (Note 2)							1	
-3	MS26545B2C0147	. . . CO ₂ CYLINDER (Note 2) (Note 3)							1	
	MS26545B4C0147	. . . CO ₂ CYLINDER (Note 2) (Note 3)							1	
-4	1106AS103-1	. . . CABLE ASSEMBLY							1	
-5	1106AS102-1	. . . HOUSING ASSEMBLY							1	
-6	MIL-A-3339	. . SEA ANCHOR, Size 2 (Note 4)							1	
Notes:		1. The inflatable liferaft P/N 62A82H2-101 comes from supply with a CO ₂ cylinder and inflation valve P/N 63A120H1-102. 2. Item is no longer procured or stocked. Item may be obtained through salvage. 3. The inflation valve and CO ₂ cylinder may be requisitioned as a complete assembly (CAGE 30003) P/N 63A120H1-14 NIIN 00-324-1701.								

NAVAIR 13-1-6.1-1

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
		<p>4. Due to low demand, sea anchors may not be stocked. They may be open purchased from the Patten Co, 1803 Madrid Ave, Lake Worth, FL (561) 588-8500.</p> <p>5. The LRU-13/A is being replaced by the new 8 person MPLR LRU-30/A, P/N 64490-101 on an attrition basis. The LRU-13/A may only be ordered for use in SAR kits. All other 7 person applications must use the new 8 person MPLR LRU-30/A, P/N 64490-101. For MPLR information see Chapter 12.</p>		

NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
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Part Number	Figure and Index Number	SM&R Code
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■ MIL-A-3339 9-22-6 PAOZZ
 MS26545B2C0147 9-22-3
 MS26545B4C0147 9-22-3
 1106AS102-1 9-22-5 PAOZZ

1106AS103-1 9-22-4 PAOZZ
 62A82H2-101 9-22-1 PAOGG
 63A120H1-71 9-22-2 XBOZZ