

## CHAPTER 14

# LPU-21/P SERIES LIFE PRESERVER ASSEMBLY

### Section 14-1. Description

#### 14-1. GENERAL.

#### WARNING

The LPU-21B/P and LPU-21C/P life preserver assemblies shall not be used in ejection seat aircraft.

14-2. The LPU-21/P series life preserver assembly is authorized for use by all aircrew personnel wearing compatible flight clothing. It is designed as a constant wear item for use with the survival vest and will not interfere with the removal of the nonintegrated parachute harness. Survival item pouches are attached to the life preserver casing. The dye marker and signal flares are not initially supplied and must be individually requisitioned. Refer to [table 14-1](#) and see [figures 14-1](#) and [14-2](#).

14-3. Modifications to the LPU-21B/P life preserver have resulted in a new letter designation being assigned to the preserver. For the sake of clarity, the term LPU-21/P series is used where appropriate. The newly procured LPU-21/P series life preserver will be the LPU-21C/P. The LPU-21B/P life preserver will remain in service until beyond capability of repair.

14-4. The LPU-21C/P flotation assembly may be used in conjunction with the LPU-21D/P casing assembly. This configuration has been designated LPU-21C(V)1/P. See [Chapter 26](#).

#### NOTE

The use of the LPU-21D/P flotation assembly with the LPU-21C/P casing is not authorized.

#### 14-5. CONFIGURATION.

#### NOTE

The LPU-21B/P and LPU-21C/P life preserver assemblies shall not be configured with the FLU-8A/P automatic inflation device. The LPU-21/P and LPU-21A/P life preserver assemblies used pull toggles for activation. After incorporation of Aircrew System Change 405, which directs installation of beaded inflation handles, the LPU-21/P and LPU-21A/P were updated to become the LPU-21B/P. The beaded inflation handles improve accessibility and provide the inflation system with a multidirectional pull capability. Manual inflation occurs when both beaded inflation handles are pulled in a natural, slightly down and straight out position from the body.

#### CAUTION

Use only Polychloroprene adhesives and Polychloroprene-coated cloth and patches on Polychloroprene-coated LPU-21/P life preserver assemblies.

14-6. The LPU-21/P series life preserver assembly weighs 4 pounds (without survival items) and provides a minimum of 65 pounds of buoyancy. The flotation assembly is constructed of polychloroprene-coated nylon cloth and consists of two independent flotation chambers. One chamber consists of the left waist lobe joined by a tube to the right collar lobe. This chamber is serviced by the carbon dioxide inflation assembly and oral inflation

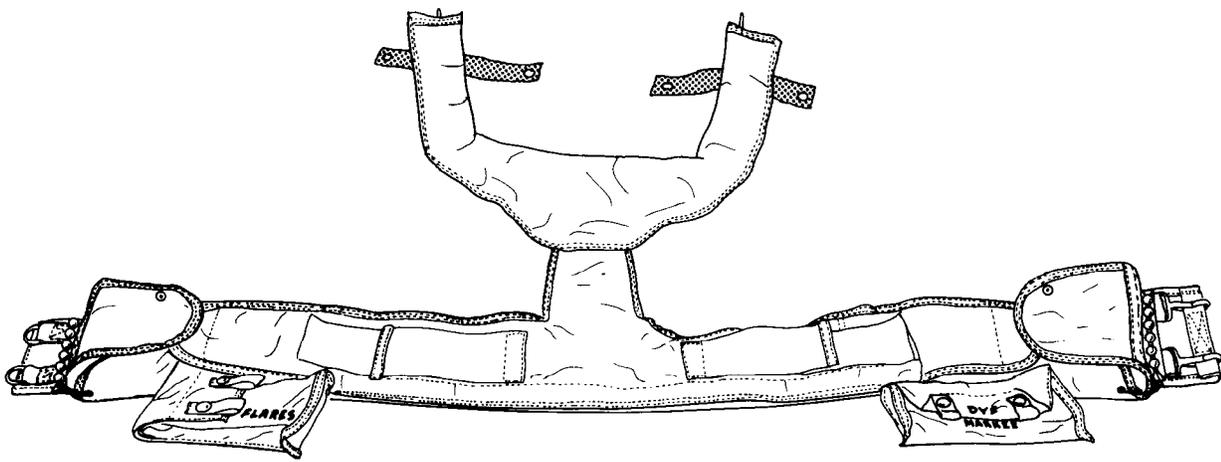
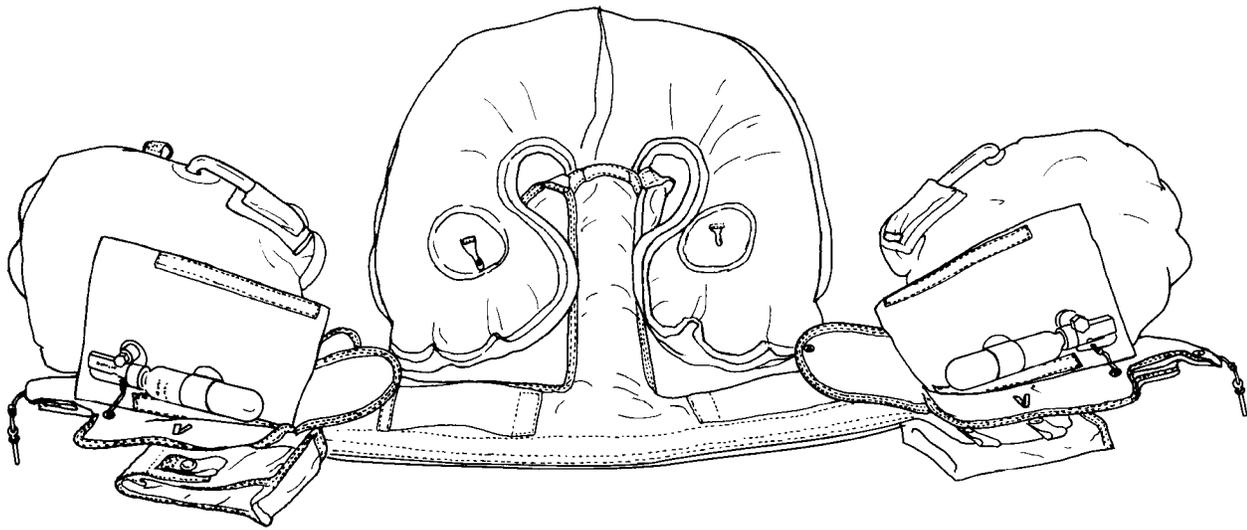


Figure 14-1. LPU-21/P Series Life Preserver Assembly

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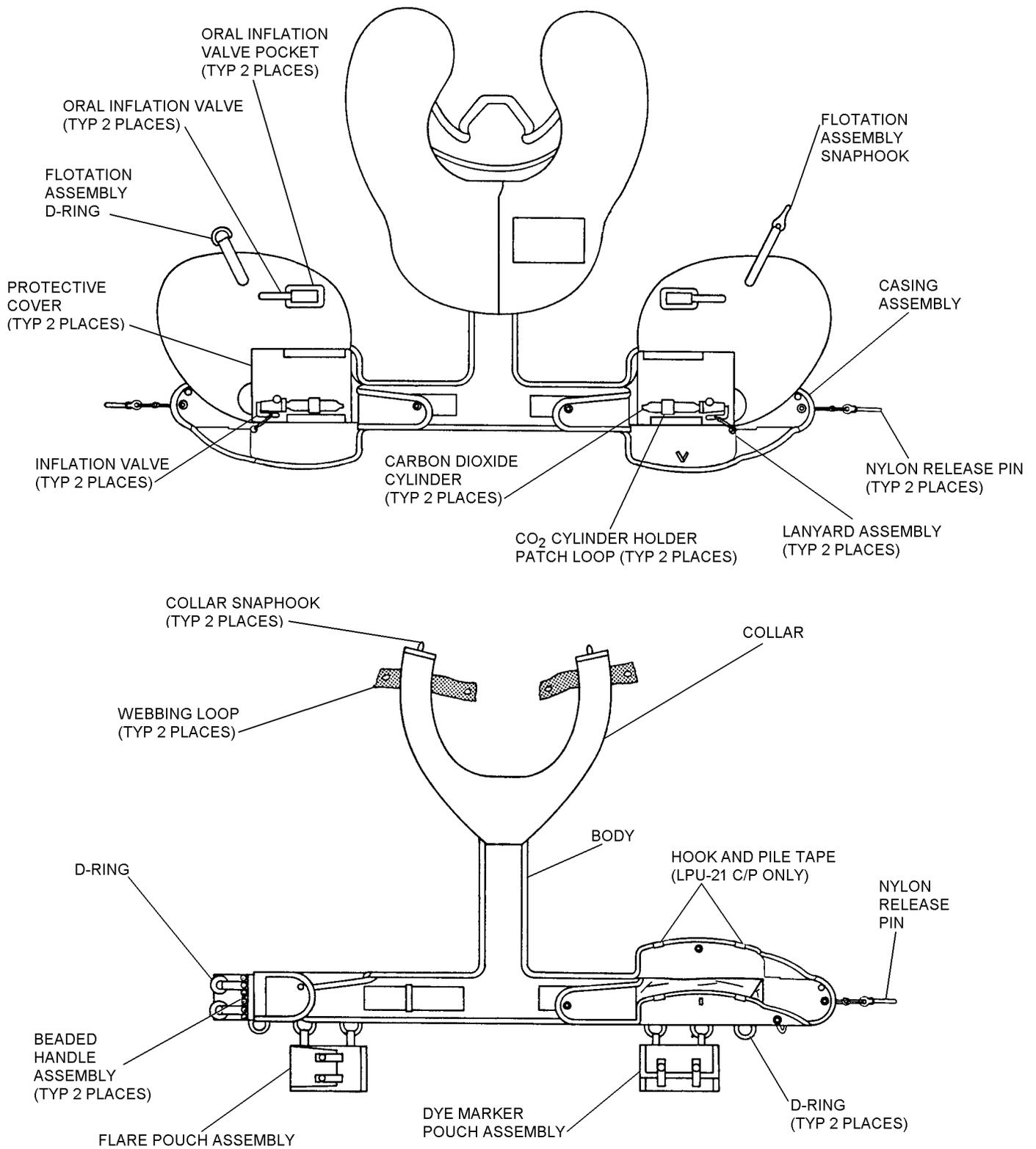


Figure 14-2. LPU-21/P Series Life Preserver Assembly, Parts Nomenclature

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valve attached to the left waist lobe. The other chamber consists of the right waist lobe joined by a tube to the left collar lobe. This chamber is serviced by the carbon dioxide inflation assembly and oral inflation valve attached to the right waist lobe. The two chambers are sewn together at the collar lobes. See [figures 14-1](#) and [14-2](#).

14-7. Each waist lobe of the flotation assembly is equipped with an attachment patch used for securing the casing assembly by means of rivets. In addition, the right waist lobe is equipped with one snaphook and the left waist lobe is equipped with one D-ring. The snaphook and the D-ring are used to secure the waist lobes together after inflation. Survival item pouches are fastened to the life preserver D-rings with directional snap fasteners.

14-8. Each collar lobe of the flotation assembly is equipped with a snaphook for attachment to the survival vest D-rings (parachute risers are routed outside of the collar lobes). In addition, an inspection record patch is also provided on a collar lobe.

14-9. The casing assembly is constructed of fire retardant aramid cloth and protects the flotation assembly. The casing assembly also provides for size adjustment and attachment to the wearer. The casing assembly consists of the adjustable casing, an adjustable webbing belt, belt keepers and D-rings, and the front connector assembly. See [figures 14-1](#) and [14-2](#).

14-10. The webbing belt, attached to the inside waist portion of the casing assembly, provides for waist size adjustment from 30 to 44 inches. The webbing belt keeper loops retain the webbing belt and provide for attachment of the Survival Vest about the wearer's waist. In addition, there are six D-rings secured to the webbing belt keeper loops, used for attachment of the survival item pouches, a raft retaining line, and other accessories.

14-11. Hook and pile tapes, attached to the outside waist portion of the casing, are used for slack adjustment. In addition, hook and pile tapes, attached about the periphery of the collar casing and the lower edge of the back portion of the casing, are used to enclose the casing assembly about the flotation assembly.

14-12. The casing assembly is secured around the wearer's waist by the front connector assembly, which consists of two snaphooks and two D-rings backed by webbing pads for comfort.

14-13. Each inflation assembly is made up of a carbon dioxide cartridge and an inflation valve. The inflation assemblies are connected to valve stems attached to each waist lobe (each valve stem is equipped with a check valve to prevent leakage). See [figures 14-1](#) and [14-2](#).

### 14-14. APPLICATION.

14-15. The LPU-21/P series life preserver assembly is authorized for use by all aircrew personnel wearing compatible flight clothing. LPU-21/P series life preservers that are modified to incorporate the FLU-8/P series automatic inflation device will be used in ejection seat type aircraft only. LPU-21/P series life preservers modified with the FLU-8A/P inflator will be redesignated the LPU-23A/P life preserver. Refer to [Chapters 16](#) and [18](#) for information pertaining to the LPU-23/P series.

### 14-16. FUNCTION.

14-17. The LPU-21/P series is manually inflated by pulling both inflation assembly beaded handles in a natural, slightly down and straight out position from the body. This action removes the retaining pins securing the casing assembly about the waist lobes and actuates the inflation assemblies. The hook and pile tapes securing the casing assembly about the collar lobes will separate as the preserver inflates.

#### NOTE

The casing must be manually opened and the flotation assembly unfolded prior to inflating a preserver through the oral inflation valve.

14-18. In an emergency situation, the oral inflation valves may be used to top-off an inflated preserver, maintain inflation of a leaky preserver or inflate a chamber if an inflation assembly malfunctions. The oral inflation valves are also used to inflate a preserver with air during an inspection test and to evacuate a preserver in preparation for packing.

**Table 14-1. LPU-21/P Series Survival Items**

Description	Quantity Required	Reference Number	NIIN	SM&R Code
Signal, Smoke and Illumination, Marine, MK-124 MOD 0 (Note 1)	2	—	01-030-8330	PA--Z
Dye Marker (Note 1)	2	MIL-S-17980	00-270-9986	PAOZZ

Notes: 1. Optional equipment at the discretion of the Squadron Commander.

## Section 14-2. Modifications

### 14-19. GENERAL.

14-20. The LPU-21/P series life preserver assembly shall be upgraded by comparing the configuration of the assembly with modifications listed in [table 14-2](#). Common repairs and fabrication instructions to maintain serviceability are listed in [table 14-3](#).

### NOTE

After incorporating the FLU-8A/P automatic inflation device, the LPU-21/P series life preserver was redesignated the LPU-23/P series. See [Chapters 16](#) and [18](#).

LPU-21/P series life preservers modified by ACC 523 shall be redesignated LPU-27/P22P-7(V). See [Chapter 17](#).

**Table 14-2. LPU-21/P Series Directives**

Description of Modification	Application	Modification Code
Add extension panel to casing webbing belt.	All LPU-21/P series life preservers used by aircrew personnel of patrol aircraft and helicopters.	66-523

After addition of extension panel, redesignate LPU-21/P series life preserver LPU-22/P22P-7(V). See [Chapter 17](#).

**Table 14-3. LPU-21/P Common Repairs and Fabrications**

Description of Repair or Fabrication	Paragraph Number
Determination of Repairability	14-56
Casing Repair Procedures	14-57
Casing Grommet Replacement	14-58
Cementing Life Preservers	14-59
Patching Life Preservers	14-60
Replacement of Oral Inflator Valve	14-62
Recementing of Bladder Fin Seams	14-63
Fabrication of Slip-on Pockets for Life Preserver Hardware	14-64
Replacement of Flare and Dye Marker Pouch Snaphooks	14-65
Replacement of Collar Lobe Snaphooks	14-66
Flare Pouch Repair	14-67
Disassembly of the Life Preserver	14-68
Reassembly of Life Preserver	14-69
Replacement of Beaded Inflation Handle Assembly	14-70
Repair of Corroded CO <sub>2</sub> Inflation Valve	14-71
Repair of Top and Bottom Gaskets	14-72
Replacement of Check Valve Assembly	14-73
Fabrication of Protective Cover Assembly	14-74
Addition of Collar Lobe Webbing Loops	14-75
Fabrication and Installation of Locking Pin Cover	14-76

## Section 14-3. Maintenance

### 14-21. GENERAL.

14-22. This section contains information on inspection, disassembly, repair/replacement, testing, and re-assembly of the LPU-21/P Series life preserver.

### 14-23. INSPECTION.

14-24. All life preservers shall be subjected to Preflight, Special and Calendar/Phase Inspections.

14-25. The Preflight Inspection shall be performed on life preservers prior to each flight by the aircrew-member to whom the life preserver is assigned. The Preflight Inspection shall be performed on life preservers installed in aircraft prior to each flight by assigned aircrewmembers.

14-26. The Special Inspection shall be performed on all aircraft installed life preservers at intervals not to exceed 30 days. The inspection shall be performed at the organizational level of maintenance by personnel assigned to the Aviator's Equipment Branch.

14-27. Make necessary entries on appropriate form in accordance with OPNAVINST 4790.2 Series. The 30-Day Special Inspection may be recorded on a separate history card from the history card recording Calendar/Phase Inspections, functional checks, and modifications.

#### NOTE

The Calendar inspection interval for life preservers assigned selected air reserve aircrew-members has been extended to 180 days vice 90 days, providing preservers are stowed under controlled conditions.

14-28. The Calendar/Phase Inspection shall be performed on all life preservers prior to placing in service. The Inspection cycle thereafter shall be as follows: personal issue life preservers shall be inspected once every 90 days. Aircraft-installed life preserver inspection shall coincide with the inspection cycle of the aircraft in which installed. See applicable Planned Maintenance System (PMS) publications for specific intervals. In no case shall the interval exceed 231 days. Unless operational requirements demand otherwise, the life preserver Calendar/Phase Inspection shall be performed by the intermediate level of maintenance or above. The functional test shall be performed prior to placing in service, every fourth inspection cycle thereafter, and whenever an inflation assembly is replaced. The leakage test shall be performed during every inspection cycle. If inspection indicates damage, complete appropriate forms in accordance with OPNAVINST 4790.2 Series and forward entire assembly to supply. Refer to [paragraph 14-56](#) for determination of repairability.

**14-29. QUALITY ASSURANCE.** Properly detailed procedures present a logical sequence for the inspection process. The more critical procedures are underlined to designate steps which require a Quality Assurance inspection to assure performance of specific requirements. After the underlined step is performed by the Aircrew Survival Equipmentman, the procedure shall be verified before the next step is performed. This verification shall be performed by a Collateral Duty Inspector or Quality Assurance Representative (CDI, CDQAR, or QAR). Work Center supervisors are primarily responsible for quality assurance within their centers. OPNAVINST 4790.2 Series permits supervisors to nominate their more experienced personnel to serve as quality assurance inspectors. Nominated personnel shall be screened and examined by the Quality Assurance Officer prior to their designation as Quality Assurance Inspectors or Quality Assurance Representatives by the Commanding Officer. Under no circumstances shall an Aircrew Survival Equipmentman perform his own quality assurance inspection.

**14-30. PREFLIGHT/SPECIAL INSPECTION.** To perform a Preflight/Special Inspection, proceed as follows:

**WARNING**

Ensure that the beaded inflation handles are readily accessible. Beaded inflation handles shall be secured with four snap fasteners to the life preserver end flap.

**CAUTION**

Do not open any sealed or safety-wired/ safety tied portions of preserver for Pre-flight/Special Inspection.

1. Inspect exposed metal parts for corrosion and damage.
2. Inspect for presence, security of attachment and, if applicable, operation of survival items.
3. Inspect casing fabric for cuts, tears, abrasions, security of stitching, and other damage.
4. Ensure beaded inflation handles are secured to snap fasteners. Inspect safety ties on beaded inflation handles. The beaded inflation handle safety ties may be replaced without removing the life preserver from service.
5. Inspect safety ties on locking pins.
6. Inspect rivets securing flotation assembly to casing for presence and security of attachment.
7. Inspect hook and pile tape closure at collar for separation; fasten as necessary.
8. Adjust and don preserver to ensure proper fit.
9. If any discrepancy is noted, the preserver shall be removed from service and repaired in accordance with procedures in this chapter.

**14-31. ACCEPTANCE/CALENDAR/PHASE INSPECTION.** The Acceptance/Calendar/Phase Inspection consists of the following tasks:

1. Beaded Inflation Handle Inspection
2. Case, Container/Pouch Inspection

3. Functional Test (every fourth inspection cycle)
4. Visual Inspection
5. Life Preserver Configuration
6. General Inspection
7. Markings Inspection
8. Survival Items Inspection
9. Inflation Assembly Inspection
10. Beaded Inflation Handle Pull Test
11. Leakage Test
12. Records Updating
13. Repacking

**14-32. BEADED INFLATION HANDLE INSPECTION.**

Inspect beaded inflation handle for the following:

1. Attachment of inflation lanyard to beaded handle.
2. Attachment of locking pin lanyard to beaded handle. Overhand knot on locking pin lanyard shall be within 3/4 inch from eye of pin.
3. Corrosion on snap fasteners and ease of operation.
4. Cuts, tears, deterioration, abrasion, stains, and general cleanliness of fabric.
5. Presence of safety tie on beaded inflation handle.

**14-33. CASE, CONTAINER/POUCH INSPECTION.**

To inspect cases, containers, and/or pouches, proceed as follows:

1. Inspect fabric for cuts, tears, deterioration, abrasion, stains, and general cleanliness.
2. Inspect seams for proper adhesion or stitching.
3. Inspect straps and loops for security and wear.
4. Inspect any other parts for wear, damage, and security.

**NOTE**

Life preservers missing the D-rings used to attach dye marker and flare pouches shall be considered serviceable provided the aircrew-member to whom it is issued does not desire to utilize the pouches.

5. All hardware for security of attachment, corrosion, damage, wear and, if applicable, ease of operation.

**NOTE**

All uni-directional snap fasteners shall be installed with the dot on the button of the snap fastener socket positioned on the side of the snap fastener to which lift must be applied to disengage the socket from the snap fastener stud.

6. Inspect uni-directional snap fastener assemblies for presence, security of attachment, proper orientation, ease of operation, corrosion, and wear.

7. If any discrepancies are found, the case, container, or pouch shall be repaired or removed from service as deemed appropriate by the inspection activity.

**14-34. FUNCTIONAL TEST.** To perform a functional test, proceed as follows:



Ensure area surrounding preserver is free of foreign objects.

1. Completely open preserver casing prior to conducting functional test. Both release pins shall be removed from their respective loops, the collar hook and pile tape fasteners shall be separated, and the waist and collar lobes shall be completely unfolded and laid out flat.

2. Actuate inflation assemblies.

3. The preserver shall fully inflate to design shape, without evidence of restriction, in less than 30 seconds.

4. If preserver does not properly inflate, determine cause. Ensure stem and valve are clean and free of foreign matter.

5. If correction is made, the preserver shall be functionally tested again.

6. Deflate preserver in accordance with [paragraph 14-35](#) to remove all CO<sub>2</sub>.

**14-35. DEFLATION.** To deflate a life preserver, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Pump, Rotary Vacuum (or equivalent)	NIIN 00-052-5015 (90567)
As Required	Hose, 3/8- or 1/2-inch Inside Diameter, Rubber	—

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

2. Deflate through oral inflation valves. Unlock oral inflation valve, hold in open position, and hold vacuum pump hose against end of oral inflation valve. When compartment is collapsed, release oral inflation valve. Screw lock closed.

**14-36. VISUAL INSPECTION.**



Remove all carbon dioxide cylinders prior to inflating life preserver with air.

**NOTE**

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

14-37. Prior to visually inspecting a life preserver assembly, the life preserver shall be inflated with air to 1.0 psig.

**14-38. LIFE PRESERVER CONFIGURATION.** The life preserver shall be updated by comparing it to [figures 14-1](#) and [14-2](#), and [Section 14-4](#).

**14-39. GENERAL INSPECTION.** Examine life preservers for the following:

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### NOTE

Refer to the referenced paragraph number at end of inspection step for repair procedures.

1. Preserver fabric for cuts, tears, punctures, deterioration and abrasion. Refer to [paragraph 14-60](#) for repair instructions.

2. Seam tapes for proper adhesion. Refer to [paragraph 14-63](#) for repair instructions.

3. Valve inlet stems for security.

4. Oral inflation valve(s) for cracks, security, ease of operation, and corrosion.

5. Patches for proper adhesion and wear. Refer to [paragraph 14-60](#) for repair instructions.

6. Any other parts for wear or other damage.

7. All hardware for security of attachment, corrosion, damage, wear and, if applicable, ease of operation.

8. Preservers for stains, dirt, and general cleanliness. Refer to [paragraph 14-50](#) for cleaning instructions.

9. Cross threading and/or loose manifold nuts.

**14-40. MARKINGS INSPECTION.** To inspect and restore marking, proceed as follows:

#### Materials Required

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

1. Compare markings on preserver to those listed in [table 14-4](#).

2. Restore any faded markings.

3. Deleted.

4. Correct any markings which do not agree with the applicable table. Paint out old marking and enter new marking as close to proper position as possible.

**14-41. SURVIVAL ITEMS INSPECTION.** To inspect survival items, proceed as follows:

1. Inventory all items by checking items against [table 14-1](#). Replace any missing or unsatisfactory item.

### NOTE

NAVAIR 13-1-6.5, Rescue and Survival Equipment contains detailed information on the inspection of survival items.

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

3. Operate all items which are not intended for one-time use. Replace as necessary.

**14-42. INFLATION ASSEMBLY INSPECTION.** To inspect life preserver inflation assemblies, proceed as follows:

1. Loosen CO<sub>2</sub> cylinder locking screws, if present, and remove CO<sub>2</sub> cylinders from valve assembly.

2. Examine inflation device, actuating lever and lanyard, and locking pins for fraying, corrosion, stripped threads, and other damage.

3. If required, remove any sharp edges from valve with a fine round file.

4. Operate actuating lever three or four times. Ensure that lever moves freely and ensure that piercing pin moves properly inside valve body. Inspect point of piercing pin for serviceability. If point is flat, rounded, dull, or otherwise worn or damaged, replace inflation assembly.

### NOTE

Each time inflation assembly gaskets or inflation assembly is removed and replaced for any reason, a functional test shall be conducted. Refer to [paragraph 14-34](#). Use new gaskets when replacing device.

5. If any discrepancy is noted in device that is not repairable in accordance with [paragraph 14-71](#), remove assembly and install a new inflation device.

6. If CO<sub>2</sub> cylinder locking screws are installed, remove them.

Table 14-4. LPU-21/P Series Life Preserver Markings

Marking (Note 1)	Location	Letter Height
P/N 68A73H1-101 (LPU-21B/P) P/N 68A73H1-103 (LPU-21C/P)	Outside surface of collar delivery tube case.	Optional
CASING, LIFE PRESERVER, LPU-21B/P 974AS103-301 CONTRACT NO. [applicable number] MANUFACTURER [applicable number] DATE OF MANUFACTURE [month and year] SERIAL NO. [applicable number]	Center of casing waist section (inside)	5/16 inch 3/16 inch
CASING, LIFE PRESERVER, LPU-21C/P 975AS103-303 CONTRACT NO. [applicable number] MANUFACTURER [applicable number] DATE OF MANUFACTURE [month and year] SERIAL NO. [applicable number]	Center of casing waist section (inside)	5/16 inch 3/16 inch
DYE MARKER	Pouch (right side)	1/2 inch
FLARES	Pouch (left side)	1/2 inch
LIFE PRESERVER LPU-21/P SERIES SPEC. MIL-L-81561 CONTRACT NO. [applicable number] MANUFACTURER [name of manufacturer] DATE OF MANUFACTURE [month and year] SERIAL NO. [applicable number]	Center of flotation tube waist section	5/16 inch 3/16 inch
Notes: 1. Replacement markings shall be stamped or stenciled using waterproof black ink.		

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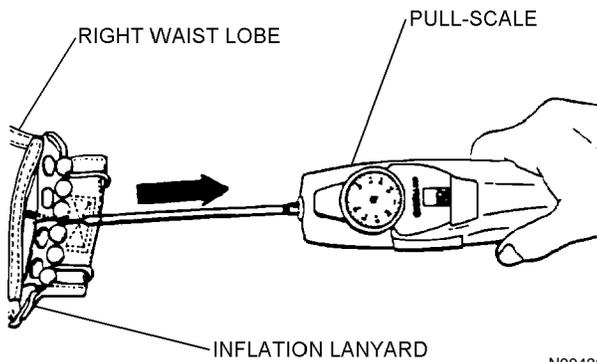
**14-43. BEADED INFLATION HANDLE PULL TEST.** To perform the beaded inflation handle pull test, proceed as follows:

### Support Equipment Required

Quantity	Description	Reference Number
1	Gage, Dial, Push/Pull, 0 to 50 lb	DPP-50 or equivalent NIIN 00-473-0108

1. Ensure that CO<sub>2</sub> cylinder has been removed. Actuate the inflator assembly. All snap fasteners on beaded inflation handle must be fully engaged.

2. Attach gage to webbing between third and fourth bead on inflation handle.



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3. Hold inflator steady. Slowly exert a 25-pound straight pull on webbing. All snap fasteners should release at or before 25 pounds.

4. If all snap fasteners do not release at or before the 25 pound limit, inspect male and female snap fasteners for damage. Replace the entire beaded inflation handle assembly if required and repeat [steps 1 through 4](#).

5. If the snap fasteners release properly, leave the pull scale attached, add an additional 25 pound force to check the security of the beaded inflation handle attachment to the inflation lanyard. Examine the lanyard for frays, ruptures, thin spots, split casing, and security of stitches and knots. If unsatisfactory, replace the entire beaded inflation handle. Refer to [paragraph 14-70](#).

**14-44. LEAKAGE TEST.** All life preservers shall be subjected to a leakage test each Calendar/Phase Inspec-

tion. To perform a leakage test proceed in accordance with [paragraph 14-46](#).

**14-45. Test Fixture.** A suggested test fixture, consisting of a three-way valve, pressure gage, and adapters for compartments being tested, is shown in [Chapter 3](#). Fixtures must be fabricated to meet the requirements of the schematic shown in [figure 14-3](#).

**14-46. Test Procedure.** To test life preservers, using test fixture shown in [Chapter 3](#), proceed as follows:

**CAUTION**

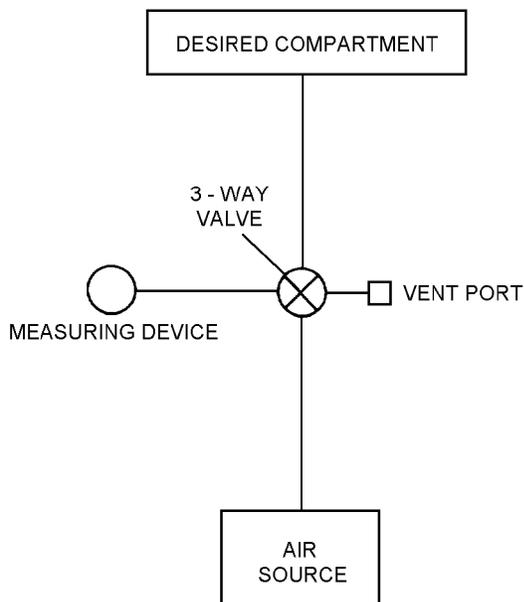
Ensure test area is free of foreign objects.

1. Ensure all carbon dioxide has been removed from any preserver which has been functionally tested.

**CAUTION**

If 3-way valve is not used, measuring device valve must be closed when air feed valve is open.

Damage may occur to oral inflation valve if air supply pressure entering the life preserver exceeds ten (10) psi during this test.



**Figure 14-3. Test Fixture Schematic**

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**NOTE**

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

2. Unlock oral inflation valve and insert into rubber hose. Rotate valve to air supply position and inflate chamber. Alternately position valve between measuring device, vent and air supply until proper pressure of 2.0 psig is attained in both chambers.

3. The air supply shall be securely shut off and after a minimum of 15 minutes, the pressure shall be readjusted, if necessary, to the original pressure of 2.0 psig in both chambers simultaneously. Record time.

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

5. Record temperature and barometric pressure.

6. After a minimum for 4 hours after completing [step 3](#), record test procedure of both chambers. Test pressure shall not decrease to less than 1.6 psig for a life preserver chamber, from a maximum test pressure of 2.0 psig.

7. Record temperature and barometric pressure and correct test pressure for any changes in temperature and barometric pressure. Refer to [tables 14-5](#) and [14-6](#).

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

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**Step 7 - Para 14-46**

**Table 14-5. Temperature Conversion Chart**

Temperature Difference (°F)	Correction (psig)
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.

8. If pressure of chamber is below 1.60 psig inflate to leakage test pressure and coat with a soap solution to locate leaks. Mark leak areas. Rinse preserver with fresh water, air dry and repair in accordance with [paragraph 14-60](#).

9. Deflate preserver in accordance with [paragraph 14-35](#).

10. Ensure that inflation valve lever is cocked. Install CO<sub>2</sub> cylinder in accordance with [paragraph 14-52](#).

**14-47. RECORDS UPDATING.** Make necessary entries on appropriate form in accordance with OPNAV-INST 4790.2 Series.

**14-48. CLEANING AND SERVICING.**

14-49. Cleaning and servicing consist of cleaning the life preserver, case, container and/or pouch, installation of the inflation valve protective covers and CO<sub>2</sub> cylinders.

**14-50. CLEANING OF LIFE PRESERVER CASINGS/BLADDERS.** To clean life preservers, machine washing is preferred on casings, containers, and pouches. Alternate method is by hand. Remove any survival items and other detachable items and proceed as follows:

Table 14-6. 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.

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 cleaning life preservers.

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.

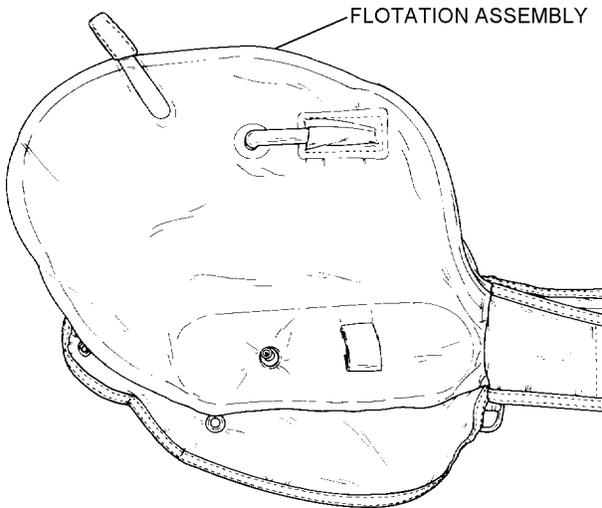
3. Allow solution to remain on surface for several minutes, then agitate with a soft brush or rag.

4. Rinse surface thoroughly with water; wipe with a cloth or sponge. Repeat this application until surface is free from all solution.

5. Dry casing before use and dry bladder with a lint-free cloth (MIL-C-85043). Apply a light coating of talc (MIL-T-50036A).

**14-51. INSTALLATION OF INFLATION VALVE PROTECTIVE COVERS.** To install inflation valve protective covers, proceed as follows:

1. Open life preserver flotation assembly, then position on a flat surface.

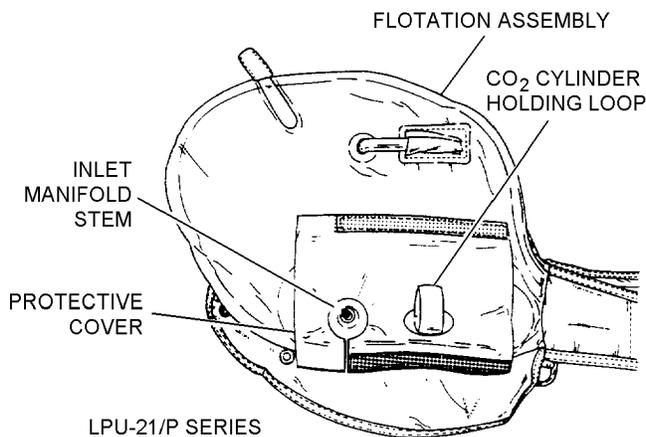


NOTE: Inflator not shown for clarity.

N0051001

**Step 1 - Para 14-51**

2. Place inflation valve protective cover upon the life preserver. Ensure that inlet manifold stem hole and CO<sub>2</sub> cylinder holding loop hole are aligned according to figure 14-4.



10140004

**Figure 14-4. Installation of Inflation Valve Protective Cover**

**14-52. INSTALLATION OF CO<sub>2</sub> CYLINDERS.** To install CO<sub>2</sub> cylinders, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Scale (Gram)	A-A-52021-1 NIIN 00-514-4117 or equivalent
1	Die, Cylinder Thread Chaser	1842-008-01 (CAGE 03688) NIIN 00-069-4040

Materials Required

Quantity	Description	Reference Number
1	Valve Stem and Seat Seal Kit (Not E)	105AS100-5 (CAGE 30003) NIIN 00-498-6964
As Required	Cylinder, CO <sub>2</sub> Type III, 35-Gram	MIL-C-25369C

Notes: 1. Seat Seal is obtained from Valve Stem and Seat Seal Kit, P/N 105AS100-5, NIIN 00-498-6964, which contains two top, two bottom, and two seat seal gaskets.

**NOTE**

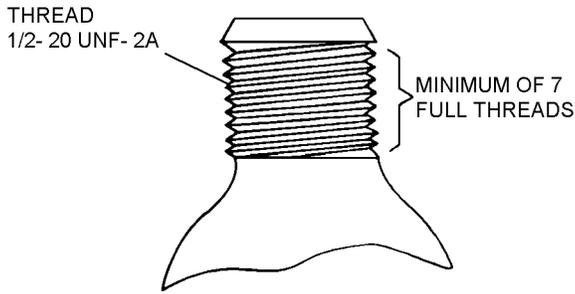
Weight of charged cylinder will vary according to manufacturer.

1. Weigh a charged cylinder and compare the minimum stamped weight with the scale weight. Discard and replace cylinder if scale weight is 2 grams less than minimum stamped weight.

2. The proper configuration of each life preserver assembly consists of an inflator (MIL-I-23145, Type II), and a CO<sub>2</sub> cylinder (MIL-C-25369, Type III, 34 to 37 grams).

3. Remove and discard inflator setscrew(s) if installed. Ensure that inflator lever is in a cocked position.

4. To assure a firm cylinder seat, conduct a cylinder thread count. Threaded portion of cylinder neck shall contain a minimum of seven full threads to assure a firm cylinder seat within valve body. Any cylinder found with less than seven full threads shall be discarded. See figure 14-5.



10140005

Figure 14-5. Cylinder Thread Count



Steel threads on CO<sub>2</sub> cylinder can cause damage to aluminum threads on inflator if cylinder is not carefully threaded. If binding occurs during installation of cylinder, use thread chaser dye on cylinder thread to cut free excessive plating. Reinstall cylinder. If binding still occurs, replace cylinder.

5. After performing functional test, insert a new seat seal gasket. At intermediate inspection intervals, inspect condition of gasket and replace if necessary.

6. Install CO<sub>2</sub> cylinder into inflator body as far as hand twisting will permit.

**NOTE**

When replacing CO<sub>2</sub> cylinder to inflator, ensure that CO<sub>2</sub> cylinder passes through the holding patch loop.

Do not install setscrews in LPU-21/P series life preservers.

7. Close inflation valve protective covers; then secure with hook and pile tape provided. See figure 14-4.

**14-53. REPAIR/REPLACEMENT.**

14-54. This section contains instructions for the repair or modification of various components or subassemblies of life preservers to ensure that appropriate items of equipment remain in Ready For Issue (RFI) status. Reference numbers for parts which are defective, corroded or worn and require replacement are included in the applicable paragraph of this section. Other replacement parts, such as carrying cases and personal survival equipment, are also listed.

14-55. Replacement of easily removed assembly components such as CO<sub>2</sub> inflation valves, survival items, are authorized in addition to repair and replacement procedures documented in this section. The life pre-

server shall be subjected to a functional and leakage test each time CO<sub>2</sub> inflation valves are removed and replaced for any reason, and each time inflation valve gaskets are replaced.

**14-56. DETERMINATION OF REPAIRABILITY.**

Patching of holes, cuts, tears or punctures 1-inch square or less are the only repairs authorized in a life preserver bladder. Life preserver shall be considered beyond repair for any of the following reasons:

1. Porous fabric areas on flotation bladder.
2. Split or open bladder seams with the exception of non-leaking bladder fin seams.
3. Leakage test failure resulting from other than repairable cut, tear or puncture.
4. Holes, cuts, tears or punctures within 1-inch of flotation bladder seams.
5. Deterioration of the rubberized fabric caused by oil, grease, or any other foreign substance.
6. Deterioration of the rubberized fabric caused by a heavy mildewed condition.

**14-57. CASING REPAIR PROCEDURES.** To repair casings, proceed as follows:

Materials Required		
Quantity	Description	Reference Number
As Required	Thread, Nylon, High Temperature Resistant, Sage Green	MIL-T-83193 NIIN 00-405-2252
	-or-	
As Required	Thread, Nylon, Type II, Size E, Sage Green	V-T-295 NIIN 00-204-3884
As Required	Cloth, Aramid, Non-melting, Type 456, Class I, Sage Green	MIL-C-83429 NIIN 01-147-2064
As Required	Tape, Hook, Sage Green, Type II	MIL-F-21840 NIIN 00-405-2266
As Required	Tape, Pile, Sage Green, Type II	MIL-F-21840 NIIN 00-405-2263

1. Minor holes, rips, tears, or abrasions in casing assembly may be repaired if they do not exceed 2 inches.

2. Repair or replace loose or damaged hook and pile tape as required.
3. Remove bladder in areas being repaired.
4. For all repairs plus loose or broken stitching use 6 to 8 stitches per inch and back stitch one half inch.
5. Casing assembly worn beyond economical repair shall be discarded.

**14-58. CASING GROMMET REPLACEMENT PROCEDURES.** To replace casing grommet, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Punch, Cutting, 3/16"	3GGG-P-833 NIIN 00-180-0941
1	Pencil, Solder	W-S-570 NIIN 00-204-3855

Materials Required

Quantity	Description	Reference Number
1"	Tape, Nylon, Sage Green, 1" Wide	MIL-T-5038 NIIN 00-753-6144
	-or-	
1 1/2" X 1 1/2"	Cloth, Aramid, Sage Green, Type 456, Class I	MIL-C-83429 NIIN 01-147-2064
2	Grommet, Brass, Size 00	MS20230B20 NIIN 00-291-0302

1. Remove bladder in areas being repaired.
2. Remove loose grommet.
3. Reinforce worn grommet hole in casing by using either nylon tape or aramid cloth.
  - a. Prepare reinforcing material.
    - (1) Cut and sear edges of a 1" piece of nylon tape
    - or

(2) Cut a 1 1/2" X 1 1/2" piece of aramid cloth and fold under 1/4" on all edges.

b. Sew reinforcing material to outside of casing, centered where possible over original grommet location. Use a cross boxstitch with 6 to 8 stitches per inch, 1/8 inch from edge.

4. Install new grommet.

a. Locate original grommet hole. Cut hole in reinforcing material using 3/16" cutting punch.

b. (For nylon tape only.) Carefully sear hole to prevent fraying using solder pencil.

c. Install grommet using 00 grommet setter and base.

**14-59. CEMENTING LIFE PRESERVERS.** Cementing of life preservers shall be performed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Roller, Wooden	GGG-R-00620 NIIN 00-243-9401

**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.

Materials Required

Quantity	Description	Reference Number
1	Brush, Disposable	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	Cement, Class 3, Polychloroprene	MIL-A-5540 NIIN 00-142-9913
As Required	Talc, Technical	MIL-T-50036A NIIN 01-089-9589

**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 a well ventilated area.

**CAUTION**

Use only Polychloroprene adhesives and Polychloroprene-coated cloth patches on Polychloroprene-coated LPU-21/P flotation assemblies.

**NOTE**

Toluene or MEK must be applied vigorously to life preserver 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. Cement shall be applied immediately after the surface has dried.

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 area to dry between applications.

**CAUTION**

The effective active period of adhesive mixtures composed of polychloroprene and an accelerator is eight (8) hours. Do not use mixture if older than eight hours.

2. Prepare only enough mixture for 8 hours. Dispose of any remaining mixture.

3. Using a disposable brush, apply cement to completely cover surfaces to be cemented. Use long, one direction strokes and complete each surface before ce-

ment becomes tacky as the brush may pull tacky cement from the surface. Allow to dry for 10 minutes.

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

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

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

7. Dust area with talc (MIL-T-50036A).

**14-60. PATCHING LIFE PRESERVERS.** Patching of life preservers shall be performed as follows:

**NOTE**

Life Preserver is not repairable if it has holes, cuts, tears, or punctures over one-inch square.

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Nylon, Polychloroprene-coated, Type I, Sage Green	MIL-C-19002 NIIN 00-935-1759

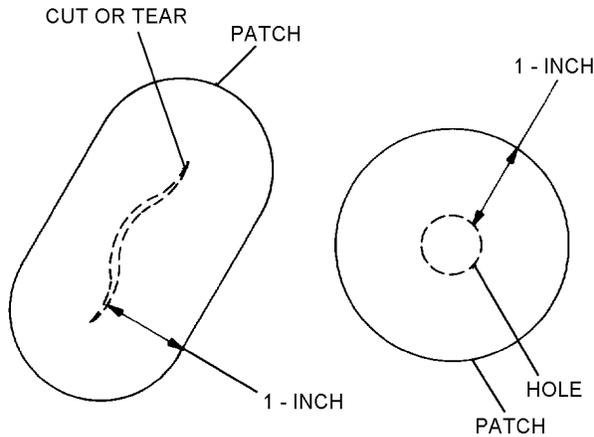
**CAUTION**

Use only Polychloroprene adhesives and Polychloroprene-coated cloth patches on Polychloroprene-coated LPU-21/P flotation assemblies.

**NOTE**

Select patch color as near as possible to color of life preserver being repaired.

1. Cut a rounded patch 1 inch larger than damage on all sides.



**Step 1 - Para 14-60**

N0060001

2. Center patch over damage and trace an outline of patch on fabric.
3. Cement patch to damaged area in accordance with [paragraph 14-59](#).
4. Dust area with talc (MIL-T-50036A).
5. Perform a leakage test.

**14-61. 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 preservers. The requirement for all other documentation remains unchanged. The reason for this change is that most history patches are unreadable and the packer's and inspector's names are documented on Aviation Crew Systems Records.

**14-62. REPLACEMENT OF ORAL INFLATION VALVE.** To replace the oral inflation valve, proceed as follows:

Materials Required		
Quantity	Description	Reference Number
1	Valve, Oral Inflation	—
As Required	Cement, Polychloroprene	MIL-A-5540 NIIN 00-142-9913
As Required	Brush, Disposable	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



Only toluene or MEK shall be used to clean oral inflation valve and tube. Only Polychloroprene cement (MIL-A-5540, NIIN 00-142-9913) shall be used to cement oral inflation valve into oral inflation tube.

1. Carefully cut through metal clamp securing oral inflation valve to oral inflation tube and remove metal band and oral inflation valve.

2. If the tip of the oral inflation tube was damaged during removal of valve, trim off damaged section.

3. Clean both surfaces to be cemented with toluene or MEK. Allow areas to dry.

4. Using a small disposable brush, carefully apply a small amount of Polychloroprene cement to the

surfaces of the tube and the valve which are to be cemented together.

5. Immediately place oral inflation valve into oral inflation tube. Oral inflation valve should be inserted up to valve shoulder. Inspect for proper application/cement.

6. Tightly wrap the cemented portion of the oral inflation tube with cord or wire and allow to cure for 48 hours before removing wrap.

7. Perform leakage test in accordance with [paragraph 14-44](#).

**14-63. RECEMENTING OF BLADDER FIN SEAMS.** This repair shall be performed only if a flotation bladder does not leak, that is, if only outer seam around bladder is split or separating. To recement an open fin seam proceed as follows:

1. If fin seam is not leaking, recement open material surrounding flotation bladder in accordance with [paragraph 14-59](#).

Figure 14-6 Deleted.

2. Perform a leakage test in accordance with [paragraph 14-44](#).

**NOTE**

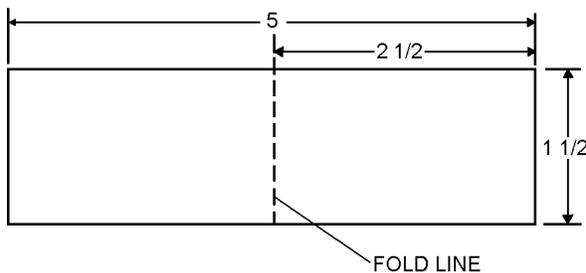
If bladder exhibits leakage from seam, bladder cell has ruptured. Dispose of life preserver after usable parts have been salvaged.

**14-64. FABRICATION OF SLIP-ON POCKETS FOR LIFE PRESERVER HARDWARE.** To fabricate slip-on pockets for life preserver hardware, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Nylon, Polychloroprene-Coated, Type I	MIL-C-19002 NIIN 00-935-1759
As Required	Thread, Nylon Size E	V-T-295 NIIN 00-204-3884

1. Cut two pieces of polychloroprene-coated nylon cloth as shown.



N0064001

**Step 1 - Para 14-64**

2. Fold piece of cloth in half along fold line.
3. Sew two sides adjacent to fold forming a pocket. Use stitch type 301 stitching 8 to 10 stitches per inch.
4. Repeat [steps 2](#) and [3](#) for other piece of cloth.

5. When packing life preserver, slip pockets over applicable pieces of hardware.

**14-65. REPLACEMENT OF FLARE AND DYE MARKER POUCH SNAPHOOKS.** To replace a broken snaphook, proceed as follows:

Materials Required

Quantity	Description	Reference Number
12 inches	Cord, Nylon, Type I	MIL-C-5040 NIIN 00-014-6699

1. Cut through metal ring portion of snaphook.
2. Remove snaphook and discard.
3. Pass end of cord through webbing loops on pouch and preserver ring.
4. Secure cord ends with binder knot, cut excess cord, and sear ends.

**14-66. REPLACEMENT OF COLLAR LOBE SNAPHOOKS.** To replace the collar lobe snaphook or webbing which is attached to the snaphook, proceed as follows:

Materials Required

Quantity	Description	Reference Number
As Required	Cloth, Nylon, Polychloroprene-coated, Type I, Sage Green	MIL-C-19002 NIIN 00-935-1759
As Required	Webbing, Textile, Woven Nylon, Type Ia, 3/4-inch	MIL-W-4088H NIIN 00-782-3224
2	Snaphook, CWBC1	MIL-S-43770/1 NIIN 01-187-9402

# NAVAIR 13-1-6.1-2

## Materials Required (Cont)

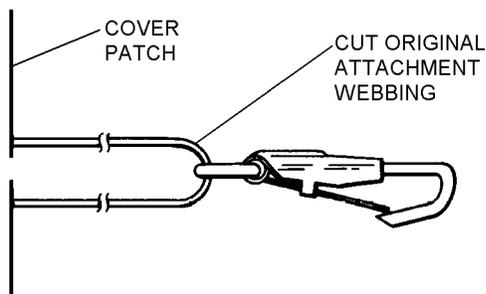
Quantity	Description	Reference Number
As Required	Thread, Nylon, Size E, Type I or II	V-T-295 NIIN 00-204-3884
As Required	Toluene	TT-T-548 NIIN 00-281-2002
	-or-	
	Methyl Ethyl Ketone (MEK)	TT-M-261 NIIN 00-281-2762
As Required	Talc, Technical	MIL-T-50036A NIIN 01-080-9589

### NOTE

Procedural [step 1](#) is for replacement of worn webbing and broken snaphook. [Step 2](#) is for replacement of the snaphook patch assembly.

1. To replace worn webbing and broken snaphook, proceed as follows:

a. Cut original attachment webbing at point where it passes through eye of snaphook and sear ends.



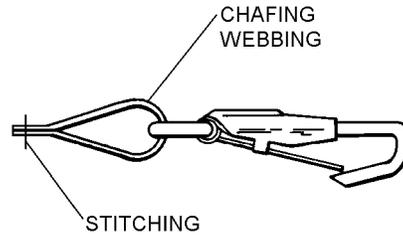
**Step 1a - Para 14-66**

N006601A

b. Replace original snaphook with copper alloy wire snaphook.

c. Cut one 2-inch length and one 1 1/2-inch length of nylon webbing and sear ends.

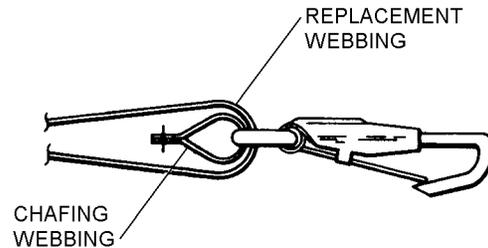
d. Pass the 1 1/2-inch length of webbing through snaphook eye and stitch one row of stitching, 10 to 12 stitches per inch, close to seared ends, securing chafing webbing to snaphook eye.



**Step 1d - Para 14-66**

N006601D

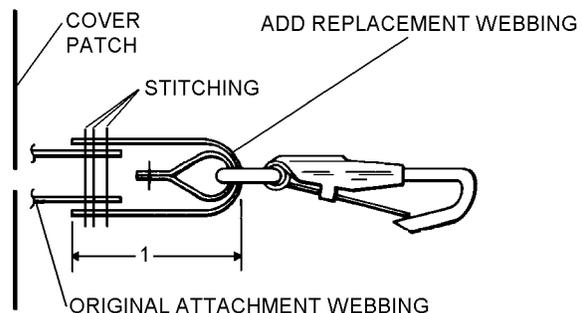
e. Pass the 2-inch length of webbing (replacement webbing) through snaphook eye and over chafing webbing.



**Step 1e - Para 14-66**

N006601E

f. Sandwich each side of original webbing between chafing webbing and replacement webbing. Stitch across webbing and backstitch forming three rows of stitching. The finished length of new webbing attachment shall be approximately 1 inch.



**Step 1f - Para 14-66**

N006601F

g. Repeat [steps a through f](#) for opposite side.

2. To replace the snaphook patch assembly, proceed as follows:

**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.

**NOTE**

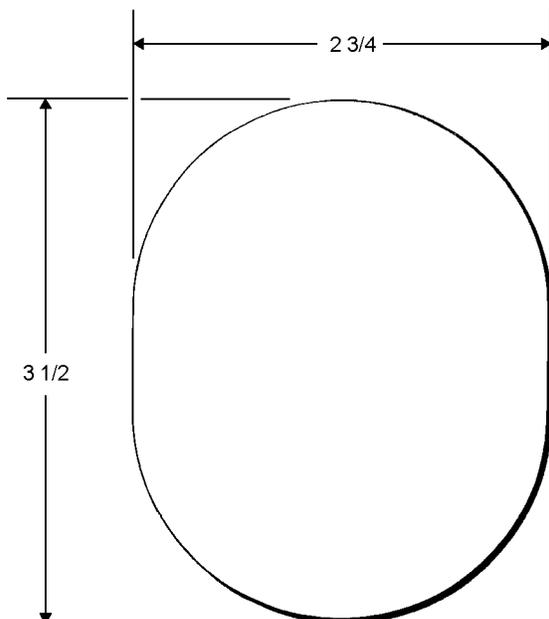
Toluene shall be the primary solvent used in the fabrication or repair of this assembly. MEK may be used if toluene is not available. Always use solvents sparingly and wipe up excess solvents; do not allow to dry by evaporation.

- a. Apply toluene or MEK to loosen patches. Remove patches from life preserver flotation bladder.

**CAUTION**

Use only Polychloroprene adhesives and Polychloroprene-coated cloth patches on Polychloroprene-coated LPU-21/P flotation assemblies.

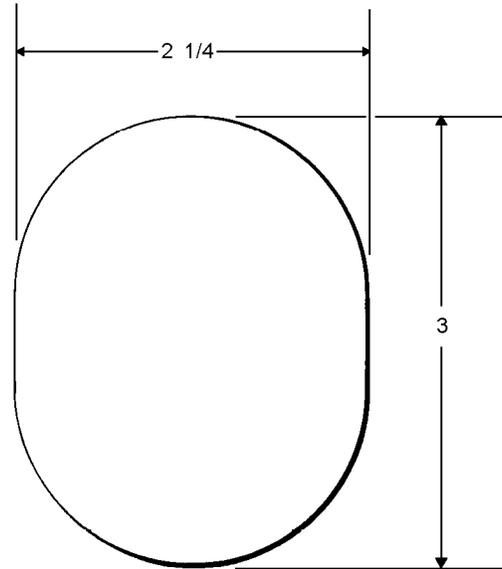
- b. Fabricate cover patch from coated cloth.



**Step 2b - Para 14-66**

N006602B

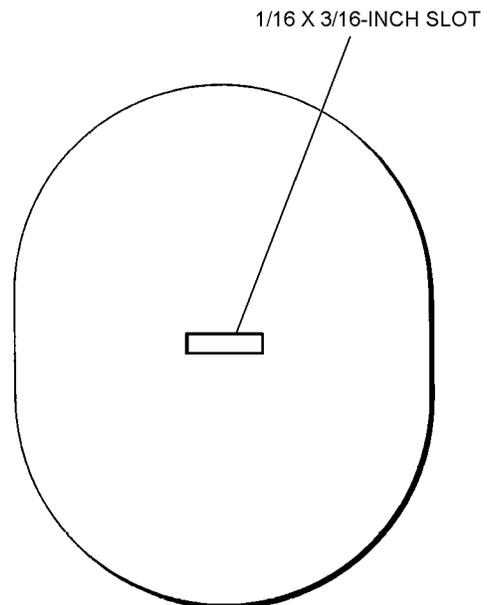
- c. Fabricate base patch from coated cloth.



**Step 2c - Para 14-66**

N006602C

- d. Cut a  $\frac{1}{16}$  x  $\frac{3}{16}$ -inch slot in cover patch.



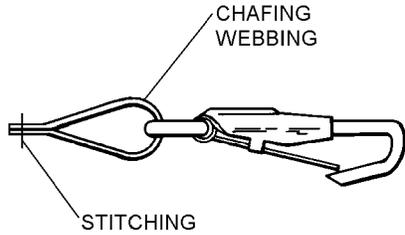
**Step 2d - Para 14-66**

N006602D

- e. Cut one 2 1/2-inch length and one 1 1/2-inch length of nylon webbing and sear ends.

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f. Pass the 1 1/2-inch length of webbing through snaphook eye and stitch one row of stitching, 10 to 12 stitches per inch, close to seared ends, securing chafing webbing to snaphook eye.

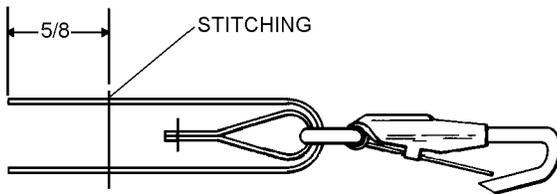


**Step 2f - Para 14-66**

N006602F

g. Pass 2 1/2-inch length of webbing through snaphook eye and over chafing webbing.

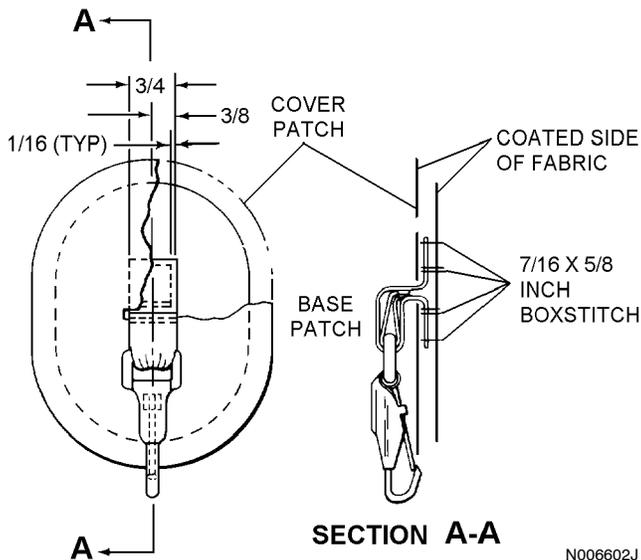
h. Sew a single row of stitching across webbing approximately 5/8 inch from end of webbing.



**Step 2h - Para 14-66**

N006602H

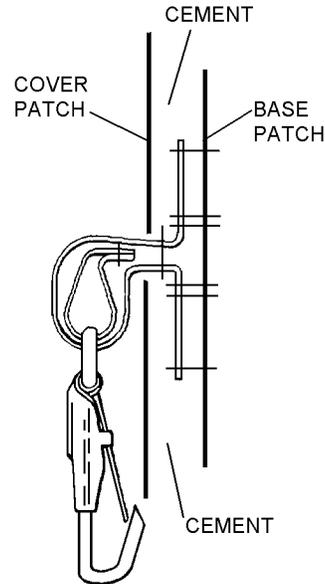
j. Insert webbing through slot opening in cover patch and sew a 7/16 x 5/8-inch boxstitch on each end of webbing to base patch.



**Step 2j - Para 14-66**

N006602J

k. Cement cover patch to base patch in accordance with paragraph 14-59.



**Step 2k - Para 14-66**

N006602K

l. Cement base patch to collar lobe on life preserver in accordance with paragraph 14-59.

m. Dust area with talc.

n. Repeat steps a through m for opposite side.

**14-67. FLARE POUCH REPAIR.** To repair flare pouch which will not close or is extremely difficult to close with flares installed, proceed as follows:

**Materials Required**

Quantity	Description	Reference Number
As Required	Thread, Nylon, Size E	V-T-295 NIIN 00-204-3884
2	Socket, Snap Fastener	MS27983-2 NIIN 00-945-2577
2	Cap, Snap Fastener	MS27983-1 NIIN 00-891-9073
3 1/2 inches	Webbing, Type VIII	MIL-W-4008

1. Remove both sets of sockets, caps, and pull tabs from pouch closure flap. Save pull tabs.

2. Position MIL-W-4008 Type VIII webbing on outside surface of pouch flap. Cut and sear webbing ends to match contour of flap end. Boxstitch webbing to flap using size E nylon thread (V-T-295). See figure 14-7.

3. Reposition both sets of sockets, caps, and pull tabs 3/8 inch closer to flap end. Use original pull tabs.

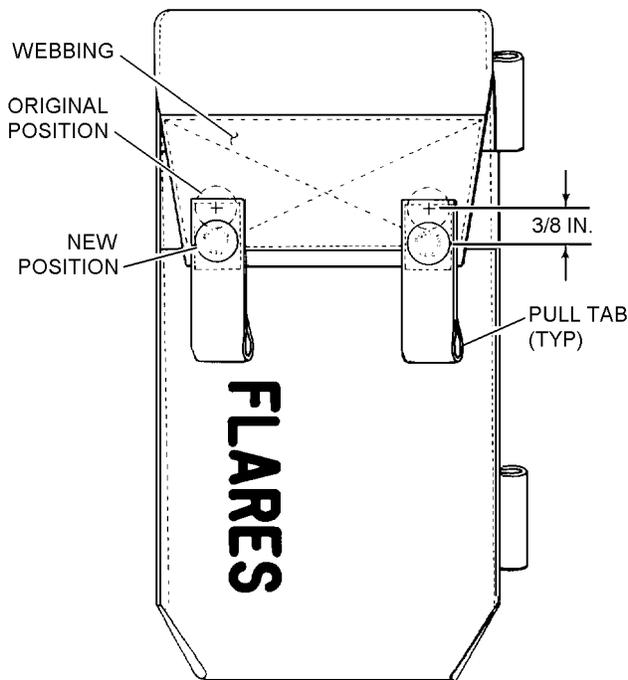


Figure 14-7. Flare Pouch Repair

10140007

**14-68. DISASSEMBLY OF THE LIFE PRESERVER.**

To disassemble the life preserver for bladder or case repairs, proceed as follows:

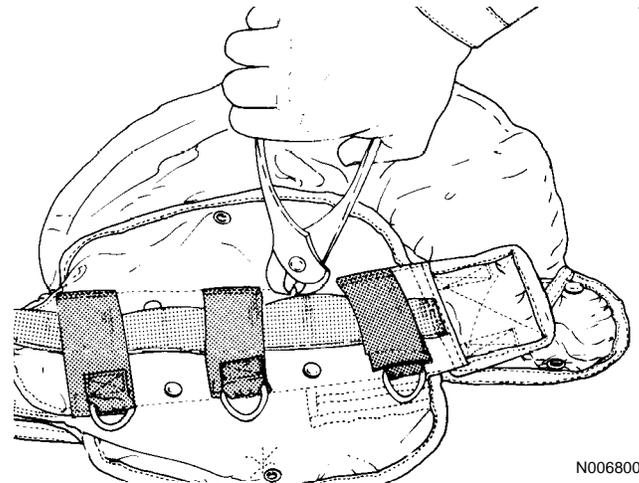
Support Equipment Required

Quantity	Description	Reference Number
1	Nipper, End Cutting	—

**NOTE**

Life preserver shall be disassembled only to the extent necessary to perform required maintenance or inspection.

1. Remove six rivets securing each waist lobe to casing with a pair of nippers.



N0068001

Step 1 - Para 14-68

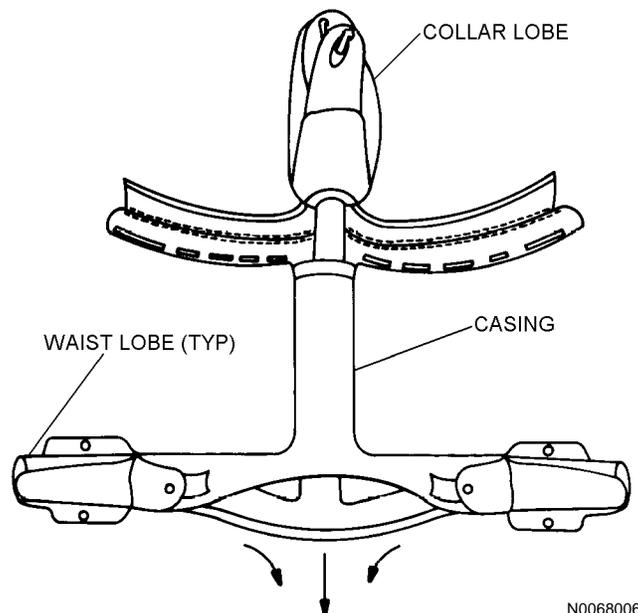
2. Open casing and remove both inflation assemblies.

3. Reattach cap nuts to valve stems.

4. Release all hook and pile tape fasteners.

5. Fold collar lobe and waist lobes to width of casing.

6. Hold casing at collar and pull flotation assembly down and out of casing, one lobe at a time.



N0068006

Step 6 - Para 14-68

## NAVAIR 13-1-6.1-2

### 14-69. REASSEMBLY OF THE LIFE PRESERVER.

To reassemble the life preserver proceed as follows:

#### Materials Required

Quantity	Description	Reference Number
12	Post, Rivet	MS27986-3B NIIN 00-281-4359
12	Cap, Rivet	MS27986-4B NIIN 00-281-2553
1	Valve Stem and Seat Seal Kit ( <a href="#">Note 1</a> )	105AS100-5 (CAGE 30003) NIIN 00-498-6964
3 feet	Cord, Nylon, Type III	MIL-C-5040 NIIN 00-240-2146

Notes: 1. Valve Stem and Seat Seal Kit, P/N 105AS100-5, NIIN 00-498-6964, contains two top, two bottom, and two seat seal gaskets.

#### NOTE

The quantity of materials listed is sufficient for reassembly of one life preserver.

#### Support Equipment Required

Quantity	Description	Reference Number
1	Press	M114 (CAGE 83058)

1. Attach one end of a 3-foot length of Type III nylon cord to snaphook on collar lobe.



Ensure flotation assembly is not twisted in casing channels.

2. Insert free end of nylon cord through back channel of casing and pull collar lobe into casing. Remove nylon cord from collar snaphook. Insert waist lobes through casing waist channels.

3. When flotation assembly is in casing assembly, ensure that it is in proper configuration and is not twisted inside casing.

4. Align rivet holes in flotation assembly attachment patches (on waist lobes) over rivet holes in casing. Insert rivets through holes and seat.

#### NOTE

The rivet cap shall be on the inside of the casing.

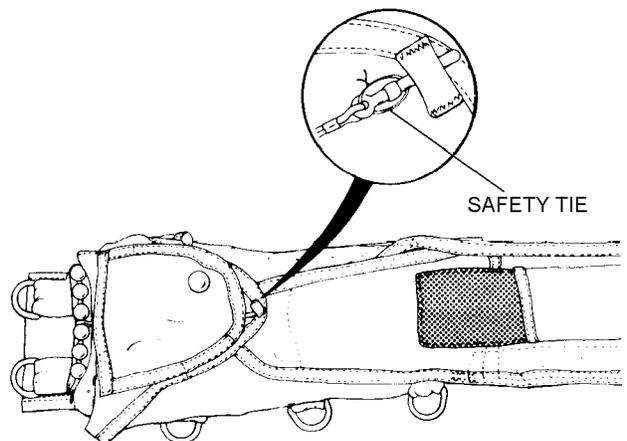
5. Remove old inflation stem gaskets and replace with new gaskets. Reinstall inflation assemblies and protective covers. Pack life preserver in accordance with [paragraph 14-78](#).

**14-70. REPLACEMENT OF BEADED INFLATION HANDLE ASSEMBLY.** To replace the beaded inflation handle, proceed as follows:

#### Materials Required

Quantity	Description	Reference Number
As Required	Handle, Beaded Inflation	975AS121-11 NIIN 01-120-4752 (CAGE 30003)
As Required	Thread, Nylon, Size E	V-T-295 NIIN 00-204-3884

1. Open snap fastener on locking pin cover; then cut and remove safety tie securing eye of locking pin to retaining loop. Carefully remove locking pin from pin keeper and retaining loop.



Step 1 - Para 14-70

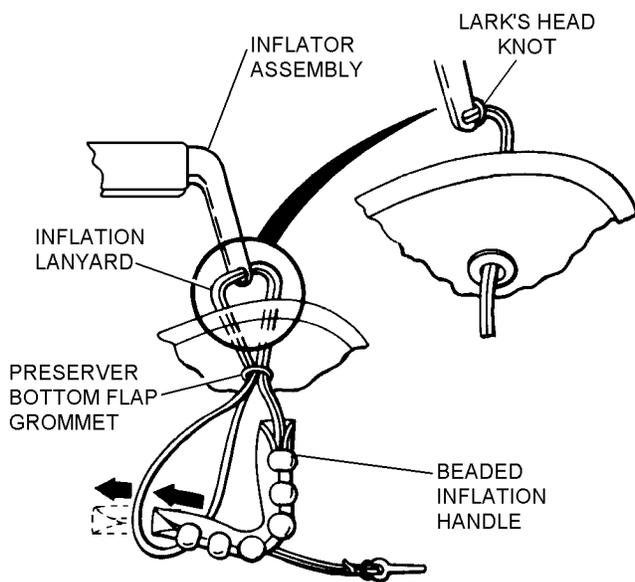
N0070001

2. Open flaps and unfold life preserver assembly.

3. Remove CO<sub>2</sub> cylinder from CO<sub>2</sub> inflator assembly. Retain CO<sub>2</sub> cylinder for reinstallation.

4. Remove inflation lanyard from inflator assembly; then unsnap beaded inflation handle from life preserver casing.

5. Secure new beaded handle inflation lanyard to actuating lever by passing lanyard through grommet in bottom casing flap and through hole in end of actuating lever. Pass lanyard back through grommet in bottom casing flap and form lark's head knot.



Step 5 - Para 14-70

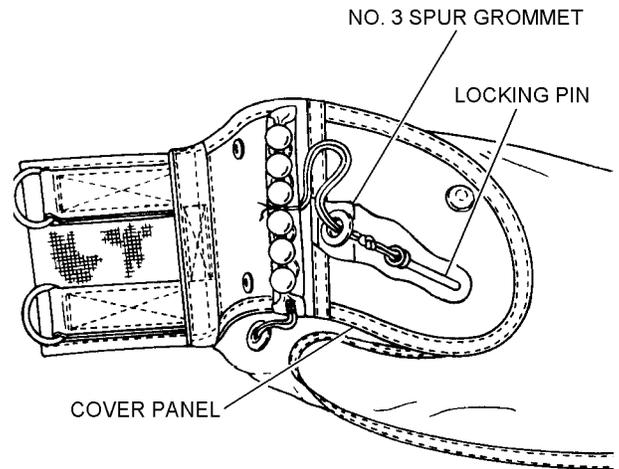
N0070005

6. Fasten beaded inflation handle to casing with snap fasteners provided; then safety-tie beaded inflation handle with one turn of size E nylon thread, single. Draw thread sufficiently to permit 1/2-inch ± 1/8-inch space between the middle beads and webbing on the preserver. Tie ends of both safety ties with a surgeon's knot followed by a square knot.

**NOTE**

Ensure that overhand knot on locking pin lanyard is within 3/4 inch from eye of pin.

7. Route locking pin under outboard flap cover panel and through No. 3 spur grommet.



NOTE: LEFT LOBE SHOWN

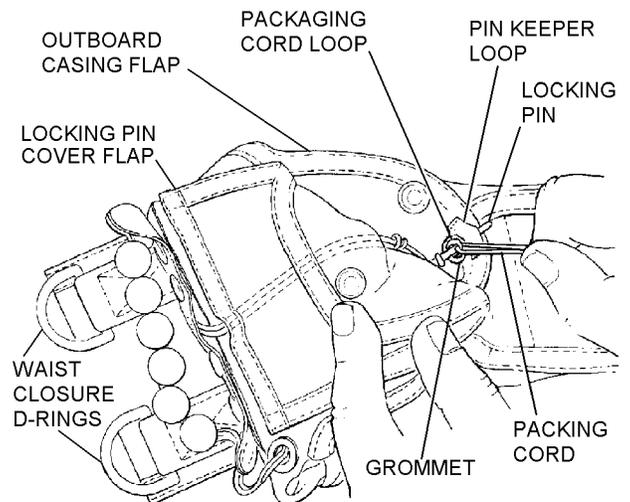
N0070007

Step 7 - Para 14-70

**NOTE**

On some late issue LPU-21 series life preservers, the No. 3 spur grommet has been deleted.

8. Route the locking pin under the locking pin cover flap through the opening in the stitching at the base of the flap, through the retaining loop/packaging cord loop, and under the pin keeper loop.



(WITHOUT NO. 3 SPUR GROMMET)

NOTE: LEFT LOBE SHOWN

N0070008

Step 8 - Para 14-70

## NAVAIR 13-1-6.1-2

9. Perform Beaded Inflation Handle Pull Test. Refer to [paragraph 14-43](#).

10. Recock CO<sub>2</sub> inflator and install CO<sub>2</sub> cylinder.

### NOTE

Ensure that all hook and pile tapes are securely mated.

11. Pack life preserver in accordance with the applicable paragraph.

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

**14-71. REPAIR OF CORRODED CO<sub>2</sub> INFLATION VALVE MIL-I-23145.** To repair CO<sub>2</sub> inflation valve, proceed as follows:

#### Materials Required

Quantity	Description	Reference Number
As Required	Lubricant, Silicone	DC7 (CAGE 71984) NIIN 00-975-0712
1	Valve Stem and Seat Seal Kit ( <a href="#">Note 1</a> )	105AS100-5 (CAGE 30003) NIIN 00-498-6964
As Required	Cloth, Emery, No. 240	—
1	Valve, Inflation, Type II	MIL-I-23145 NIIN 00-012-3571
As Required	Abrasive Mat	MIL-A-9962 NIIN 00-967-5093
As Required	Corrosion Preventative Compound (Amiguard) Type I	MIL-C-85054 NIIN 01-041-1596

Notes: 1. Valve Stem and Seat Seal Kit, P/N 105AS100-5, NIIN 00-498-6964, contains two top, two bottom, and two seat seal gaskets.

1. Remove CO<sub>2</sub> cylinder from valve. Discard seat seal gasket.

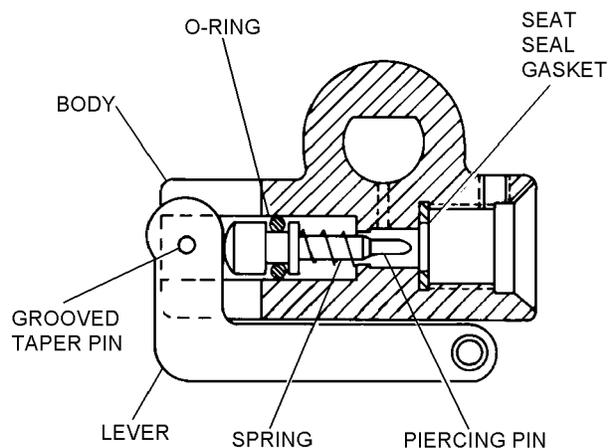
2. Remove inflation valve from preserver. Discard two gaskets on valve stem.

3. Remove grooved taper pin (retaining lever) from inflation valve, using awl and mallet. See [figure 14-8](#).

4. Remove lever, spring, and piercing pin. If spring is broken or corroded, replace entire valve.

5. If piercing pin or actuating lever is corroded, remove corrosion with abrasive mat. If abrasive mat is ineffective, use 240 grit emery cloth. Do not damage O-ring on piercing pin. Wipe off any dirt or moisture from actuating lever and apply a thin coat of MIL-C-85054 and allow to dry.

6. Clean residue from actuating lever on piercing pin. Lightly coat base of piercing pin with silicone lubricant.



**Figure 14-8. CO<sub>2</sub> Inflation Assembly**

10140008

7. Reassemble inflation valve and operate actuating lever three or four times. Ensure that lever and piercing pin move freely.

8. If piercing pin and lever do not move freely, obtain replacement valve.

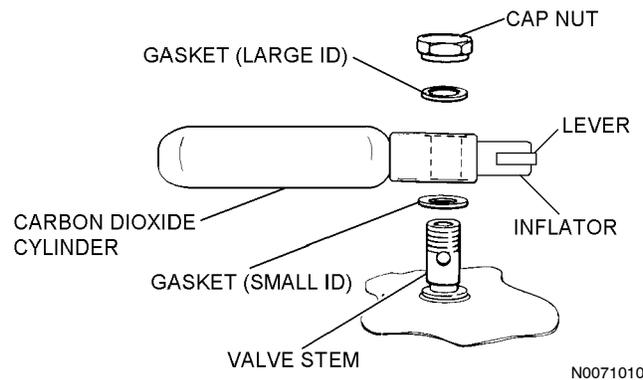
9. Reinstall inflation valve on life preserver using new gaskets.



Valve stem may rotate if cap nut is over torqued.

10. Install cap nut onto valve stem and torque to a value of  $8 \pm 1$  in-lb.

11. Reinstall CO<sub>2</sub> cylinder using new seat seal gasket.



Step 11 - Para 14-71

**14-72. REPLACEMENT OF TOP AND BOTTOM GASKETS.** To replace the top and bottom gaskets on the inflators, proceed as follows:

Support Equipment Required

Quantity	Description	Reference Number
1	Wrench, 9/16-inch	—

Materials Required

Quantity	Description	Reference Number
1	Valve Stem and Seat Seal Kit (Note 1)	105AS100-5 (CAGE 30003) NIIN 00-498-6964

Notes: 1. Top and bottom gaskets are obtained from Valve Stem and Seat Seal Kit, P/N 105AS100-5, NIIN 00-498-6964, which contains two top, two bottom, and two seat seal gaskets.

1. Remove cap nut and top gasket from inflator.



Ensure that gaskets are properly positioned. The top gasket has a larger internal diameter than the bottom gasket.

2. Remove inflator and replace bottom gasket.
3. Carefully place inflator onto valve stem.
4. Install top gasket onto valve stem.



Valve stem may rotate if cap nut is over torqued.

5. Tighten cap nut onto valve stem and torque to a value of  $8 \pm 1$  in-lb.

6. Perform functional and leakage tests on life preserver cell that was repaired. Refer to paragraphs 14-34 and 14-44.

**14-73. REPLACEMENT OF CHECK VALVE ASSEMBLY.** To replace a defective check valve assembly, proceed as follows:

Materials Required

Quantity	Description	Reference Number
1	Valve, Pneumatic Inflator (Check Valve Assembly) (Note 1)	Schrader-Bridgeport P/N 8457500047

Notes: 1. Schrader-Bridgeport P/N 8457500047 must be open purchased from:  
Schrader-Bridgeport Intl  
205 Frazier Rd  
P.O. Box 668  
Altivista, VA 24517  
Phone (804) 369-8875

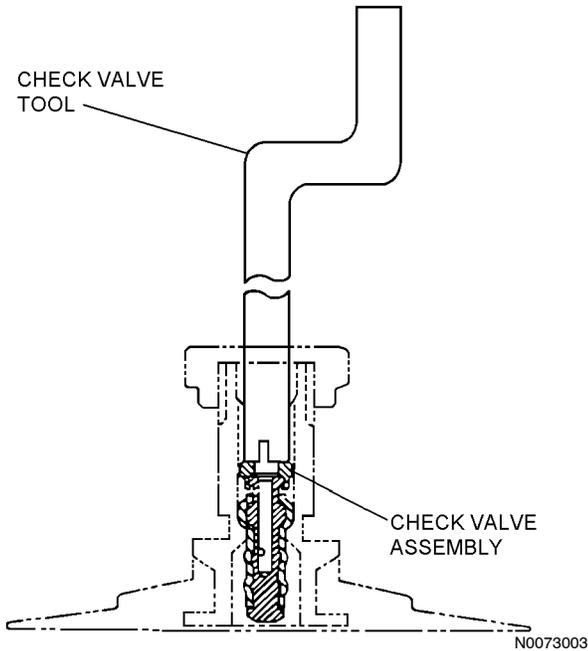
Support Equipment Required

Quantity	Description	Reference Number
1	Tool, Valve Core	8769A or equivalent (CAGE 27783) NIIN 01-354-5423
1	Wrench, Torque	—

1. If not available, fabricate a valve core tool as shown in Chapter 3.

# NAVAIR 13-1-6.1-2

- Remove inflator cap nut.
- Insert valve core tool and unscrew check valve from valve stem.



**Step 3 - Para 14-73**

- Insert new check valve in valve stem and tighten with valve core tool hand tight.



Valve stem may rotate if cap nut is over torqued.

- Replace cap nut and torque to a value of  $8 \pm 1$  in-lb.

- Perform a functional and leakage test on life preserver cell that was repaired. Refer to paragraphs 14-34 and 14-44.

**14-74. FABRICATION OF PROTECTIVE COVER ASSEMBLY.** To fabricate a protective cover, proceed as follows:

### Materials Required

Quantity	Description	Reference Number
17 x 6 inches	Cloth, Nylon, Polychloroprene-coated, Type I, Sage Green	MIL-C-19002 NIIN 00-935-1759

### Materials Required (Cont)

Quantity	Description	Reference Number
12 x 5/8 inches	Fastener, Tape, Hook, Type II	MIL-F-21840
12 x 5/8 inches	Fastener, Tape, Pile, Type II	MIL-F-21840
As Required	Thread, Nylon, Type I or II, Size E, Sage Green	V-T-295 NIIN 00-204-3884

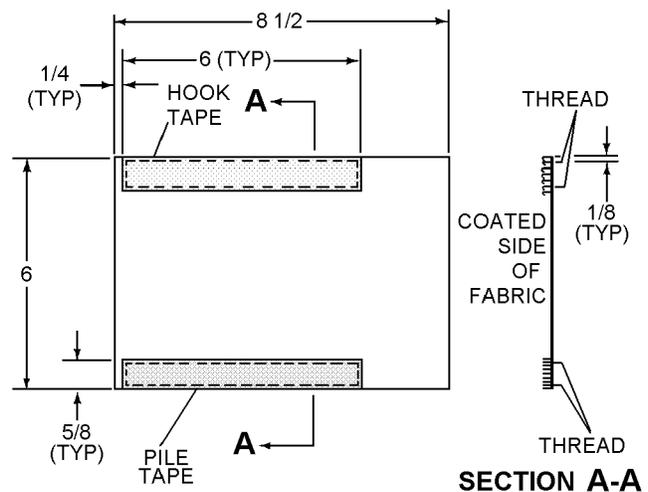
### NOTE

Procedural [step 1](#) is for a right protective cover and [step 2](#) is for a left protective cover.

- To fabricate a right protective cover, proceed as follows:

- Cut an 8 1/2-inch length of cloth.

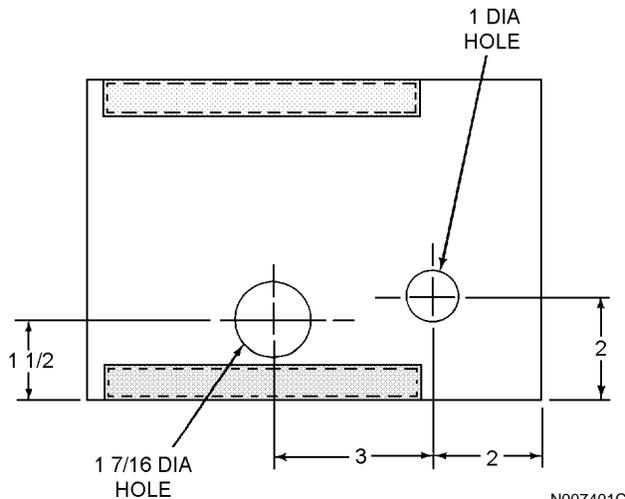
- Cut a 6-inch length of hook and pile tape and sew to the coated side of the cloth. Use stitch type 301 stitching 8 to 10 stitches per inch.



**Step 1b - Para 14-74**

N007401B

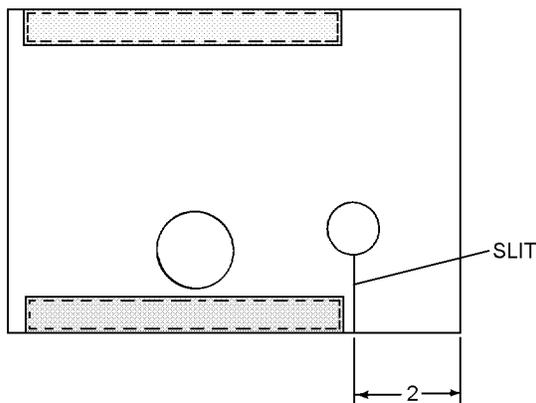
c. Position cloth, coated side up, over cutting board and punch a 1 7/16-inch diameter hole and a 1-inch diameter hole.



Step 1c - Para 14-74

N007401C

d. Cut slit into cloth up to the 1-inch diameter hole.



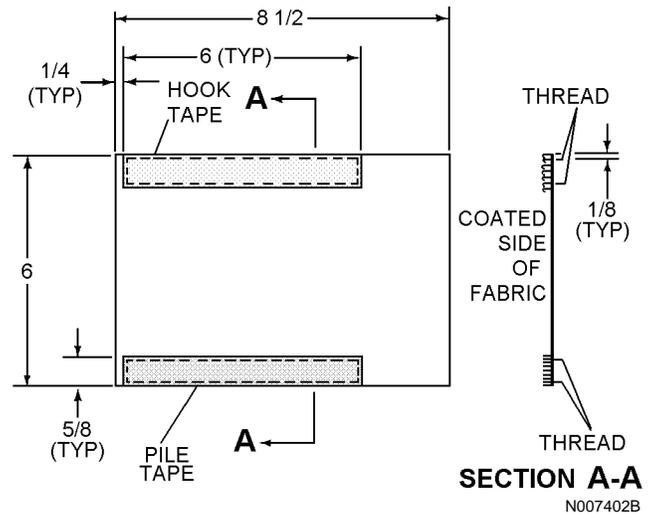
Step 1d - Para 14-74

N007401D

2. To fabricate a left protective cover, proceed as follows:

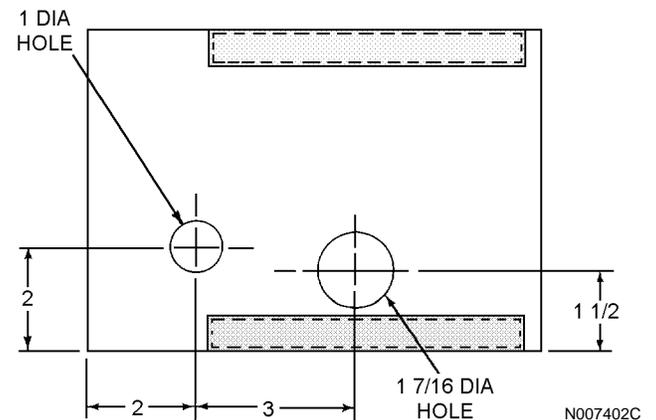
a. Cut an 8 1/2-inch length of cloth.

b. Cut a 6-inch length of hook and pile tape and sew to the coated side of the cloth.



Step 2b - Para 14-74

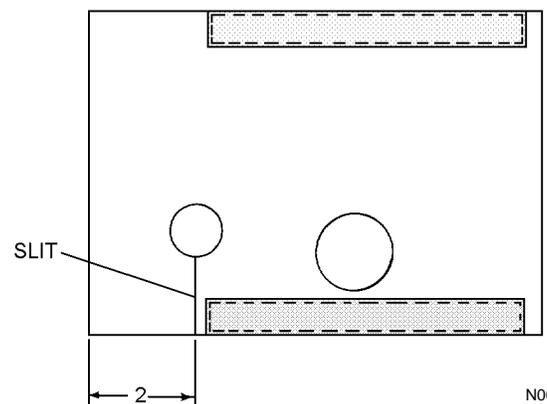
c. Position cloth, coated side up, over cutting board and punch a 1 7/16-inch diameter hole and a 1-inch diameter hole.



Step 2c - Para 14-74

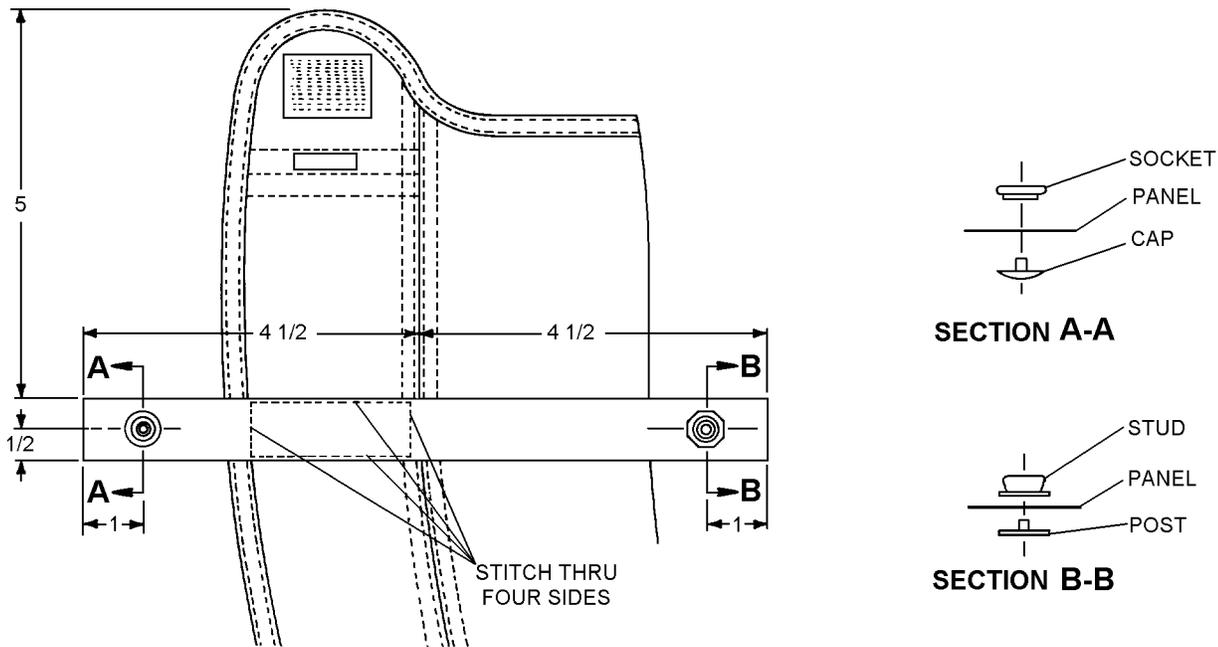
N007402C

d. Cut slit into cloth up to the 1-inch diameter hole.



Step 2d - Para 14-74

N007402D



10140009

Figure 14-9. Addition of Webbing Loops

**14-75. FABRICATION OF COLLAR LOBE WEBBING LOOPS.**

To fabricate collar lobe webbing loops, proceed as follows:

Materials Required (Cont)

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

Materials Required

Quantity	Description	Reference Number
18-inch Length	Webbing, Nylon, Type IV, 1-inch Width	MIL-T-5038, NIIN 00-261-8579 (CAGE 81349)
2	Post, Snap Fastener	MS27981-5B, NIIN 00-250-6858 (CAGE 96906)
2	Stud, Snap Fastener	MS27981-4B, NIIN 00-901-9660 (CAGE 96906)
2	Socket, Snap Fastener	M527981-3B, NIIN 00-276-4966 (CAGE 96906)
2	Cap, Snap Fastener	M527981-1B, NIIN 00-276-4954 (CAGE 96906)

**NOTE**

All stitching shall be 10 to 12 stitches per inch, size E nylon thread.

1. Cut two 9-inch lengths of 1-inch wide nylon webbing and sear ends.

2. Sew one piece of webbing to outer side of each collar lobe casing in accordance with dimensions shown in figure 14-9.

3. Position and install snap fasteners in accordance with dimensions shown in figure 14-9, and ensure proper mate.

**14-76. FABRICATION AND INSTALLATION OF LOCKING PIN COVER (LPU-21 SERIES LIFE PRESERVERS WITHOUT NO. 3 SPUR GROMMET).**

Fabricate and install the locking pin cover, for life preservers without No. 3 spur grommet, as follows:

Materials Required		
Quantity	Description	Reference Number
1	Socket, Snap Fastener	MS27981-3B NIIN 00-276-4966
1	Cap, Snap Fastener	MS27981-1B NIIN 00-276-4954
As Required	Cloth, Nylon, Polychloroprene-coated, Type I Sage Green	MIL-C-19002 NIIN 00-935-1759
As Required	Thread, Stitching, Nylon, Type I or II, Size E	V-T-295 NIIN 00-204-3884
As Required	Tape, Binding, Nylon, 3/4-inch Wide, Sage Green 1551 Type III	MIL-T-5038 NIIN 00-176-8083

1. Cut basic locking pin cover from polychloroprene coated nylon cloth in dimensions shown in [figure 14-10](#). Define form of locking pin cover using appropriate end of casing waist lobe assembly as pattern.

2. Reinforce fabric with single row stitching around entire perimeter of locking pin cover.

3. Apply 3/4 inch binding tape to perimeter of cover as shown in [figure 14-10](#).

**NOTE**

Binding tape may be in one continuous strip or two sections

4. Align locking pin cover with mating surface of casing assembly and install in accordance with [figure 14-11](#).

5. Mark snap fastener alignment and install locking pin cover, snap fastener socket and button.

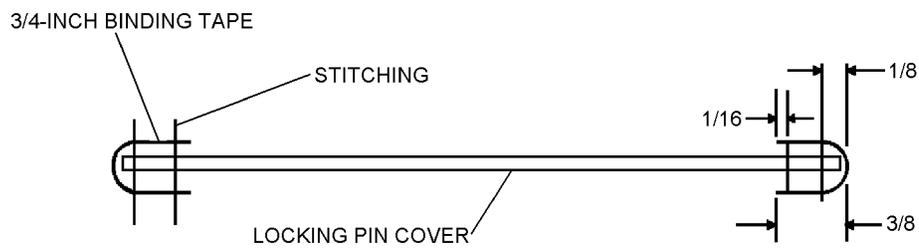
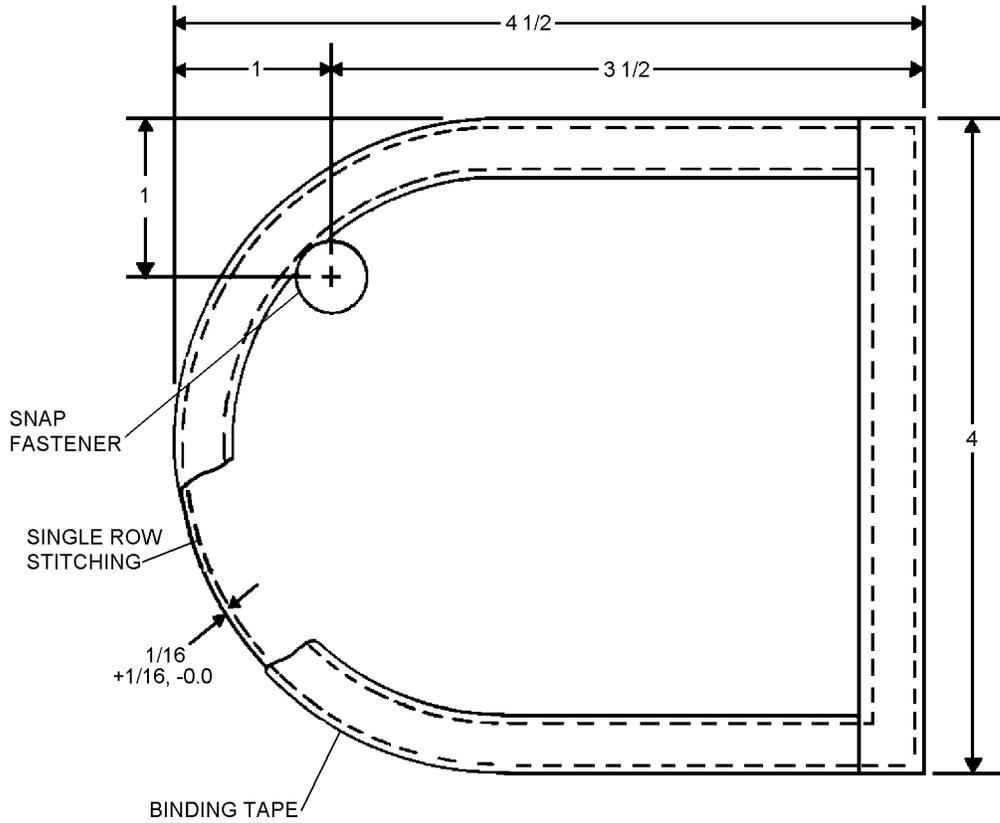
**NOTE**

When properly aligned with casing assembly, the straight edge of locking pin cover will be butted 1/8 inch from edge of beaded inflation handle snap fastener stud installation (casing main panel subassembly).

**14-77. Deleted.**

**14-78. PACKING PROCEDURE FOR LPU-21/P SERIES LIFE PRESERVER ASSEMBLY.**

14-79. The LPU-21/P series shall be packed by qualified personnel at the lowest level of maintenance level possible. For cleaning and servicing refer to [paragraph 14-48](#).

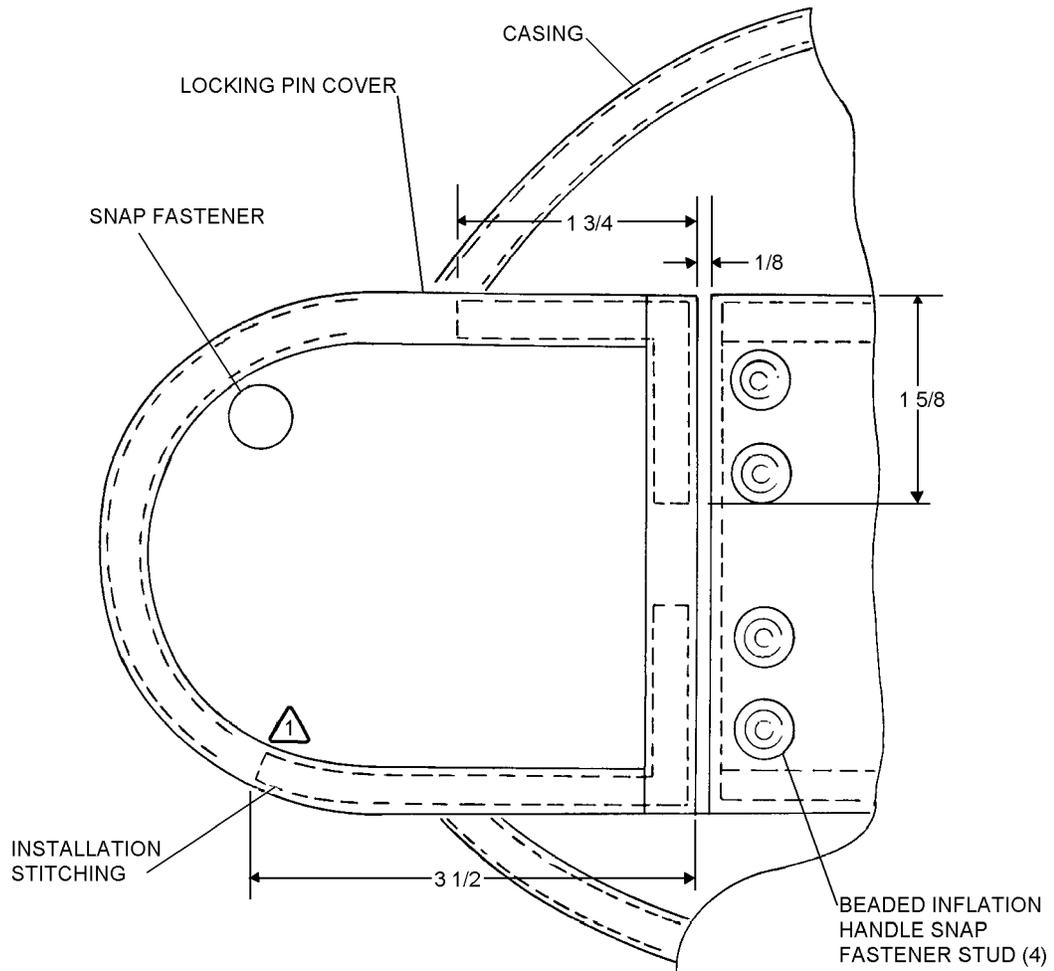


BINDING TAPE INSTALLATION

RIGHT HAND SHOWN - LEFT HAND OPPOSITE

Figure 14-10. Fabrication of Locking Pin Cover

10140010



RIGHT HAND SHOWN - LEFT HAND OPPOSITE

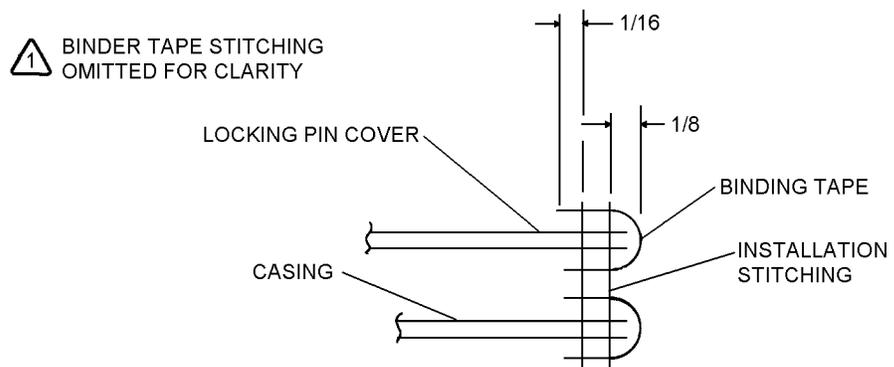


Figure 14-11. Locking Pin Cover Installation

10140011

■ Figure 14-12 Deleted.

14-80. To pack an LPU-21/P series life preserver assembly, proceed as follows:

Materials Required

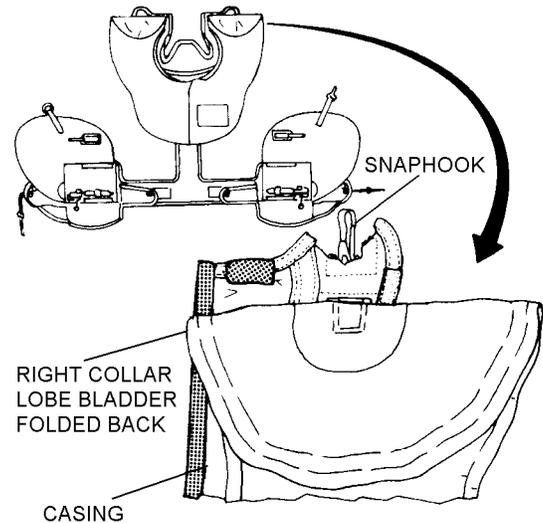
Quantity	Description	Reference Number
As Required	Talc, Technical	MIL-T-50036A NIIN 01-080-9589
As Required	Cord, Nylon Type I	MIL-C-5040 NIIN 00-240-2154
As Required	Thread, Nylon Size A	V-T-295 NIIN 00-204-3803
As Required	Thread, Nylon Size E	V-T-295 NIIN 00-204-3884

1. Ensure that life preserver has been inspected in accordance with paragraph 14-23.

2. Prior to packing, ensure that chambers are thoroughly deflated. Ensure all bladder surfaces front and rear are lightly dusted with talc.

3. Oral inflation valve shall be locked by knurled ring and placed in oral valve pocket. Position LPU-21/P series life preserver assembly with collar panel folded down.

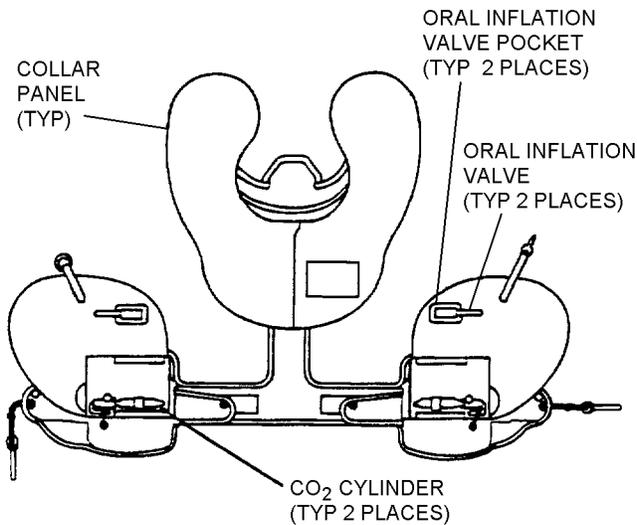
4. Insert collar snaphooks through slots in collar casing and fold collar edge over slots in casing.



Step 4 - Para 14-80

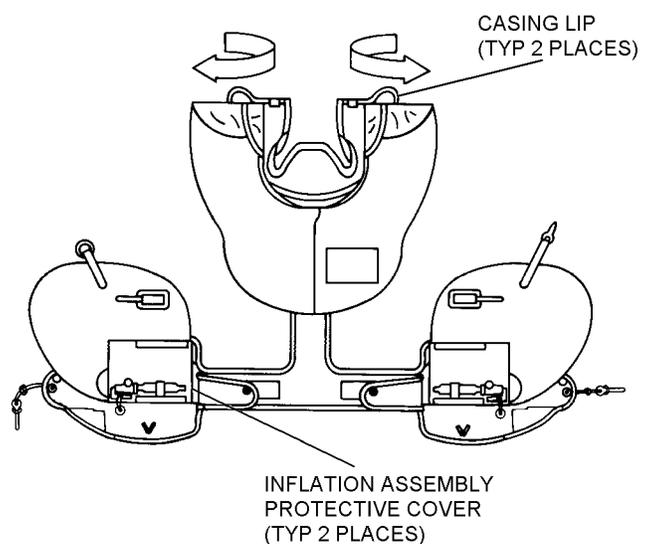
N0080004

5. Fold over edge of collar panels.



Step 3 - Para 14-80

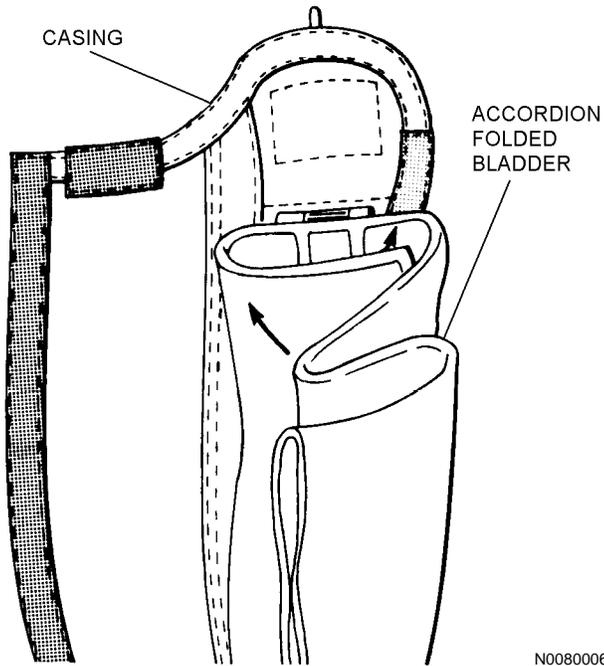
N0080003



Step 5 - Para 14-80

N0080005

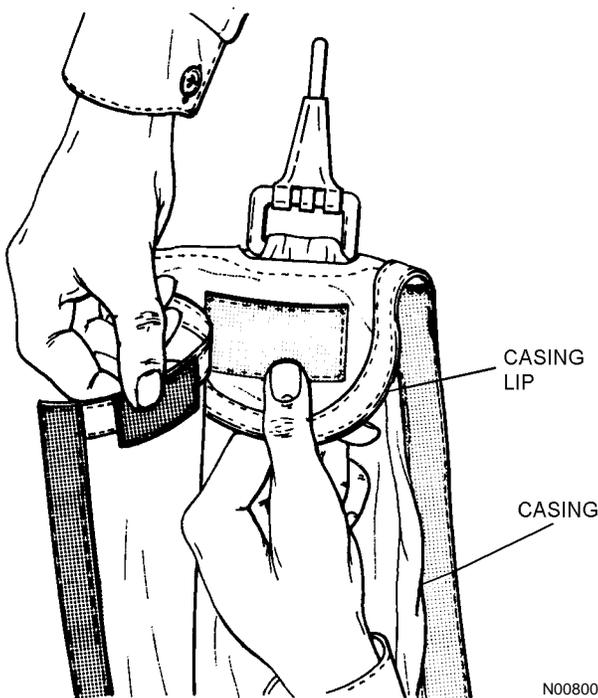
6. Accordion-fold sides of collar lobes into collar casing.



Step 6 - Para 14-80

N0080006

7. Tuck in casing lip and secure collar casing with hook and pile tape.



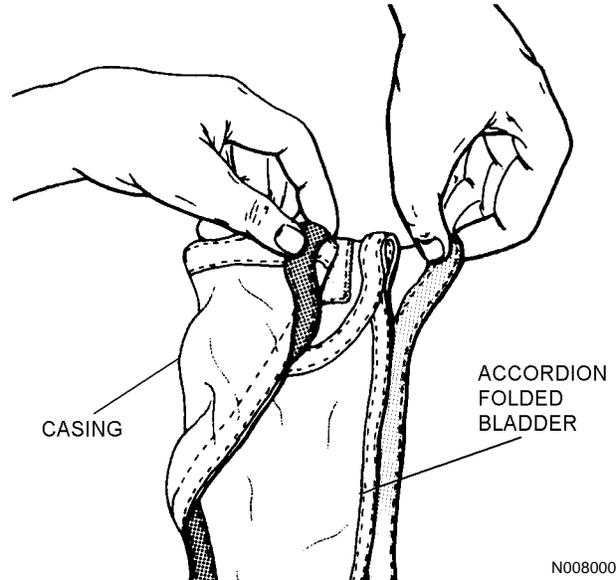
Step 7 - Para 14-80

N0080007

**NOTE**

The unsewn 3/8- to 1/2-inch end tab of hook, tape located on the front edge of the collar lobe casing shall be attached to the mating pile tape on the collar casing cover.

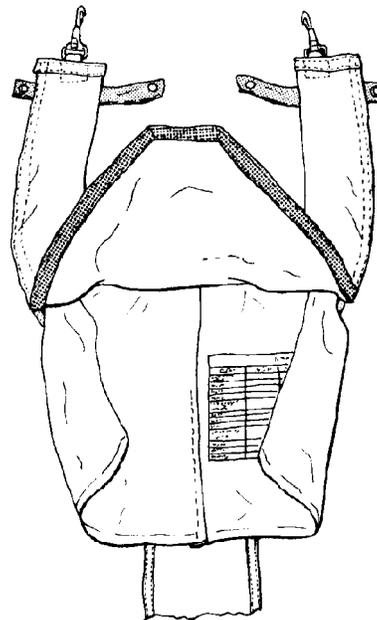
8. Close collar lobe section by securing the 3/8- to 1/2-inch unsewn portion of hook tape to pile tape on casing cover.



Step 8 - Para 14-80

N0080008

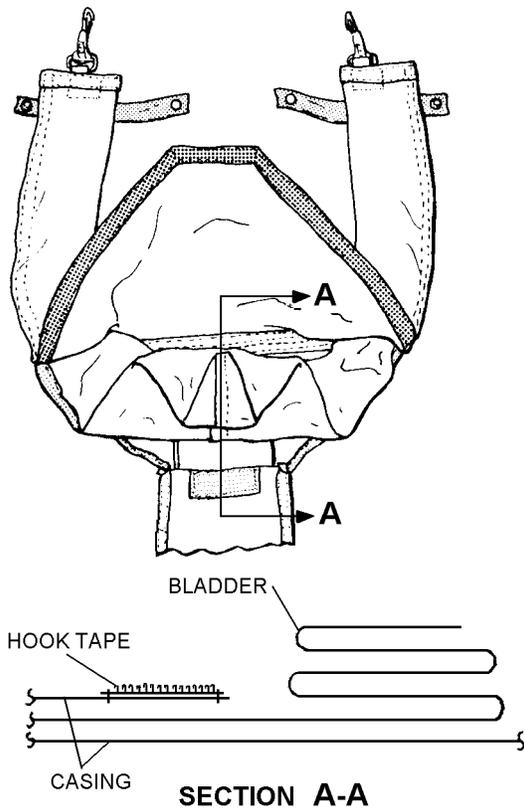
9. Secure hook and pile tape approximately 8 inches along casing cover edge, securing the accordion-folded bladder within casing cover.



Step 9 - Para 14-80

N0080009

10. Accordion-fold bottom of collar lobe into collar casing.



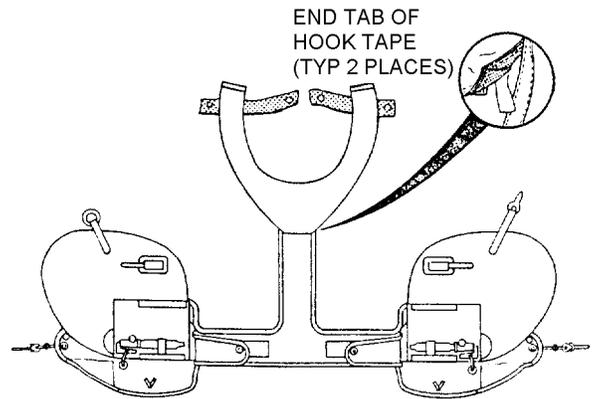
Step 10 - Para 14-80

N0080010

**NOTE**

The unsewn 3/8- to 1/2-inch end tab of hook tape located on the rear edges of the collar lobe casing shall be attached to the mating pile tape on the collar casing cover.

11. Continue securing hook and pile tape along casing cover edge and casing lip, ending on unsewn end tabs of hook tape, completely enclosing collar lobe bladder within casing cover. Ensure all hook tape is engaged with pile tape and not exposed.



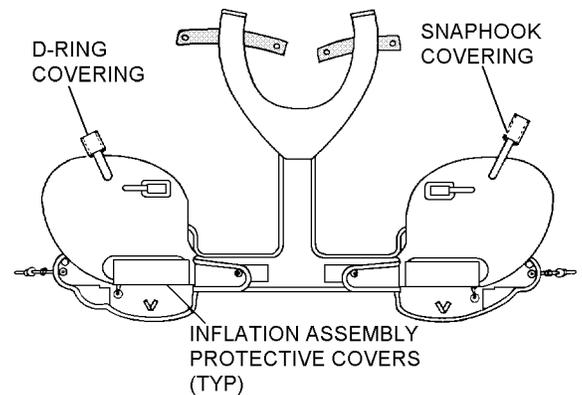
N0080011

Step 11 - Para 14-80

**WARNING**

Ensure that rubber bands are not used to retain slip-on pockets to D-ring and snap-hook fittings.

12. Insert snaphooks and D-ring into slip-on pockets. Close protective cover around inflation assembly and secure with hook and pile tape.

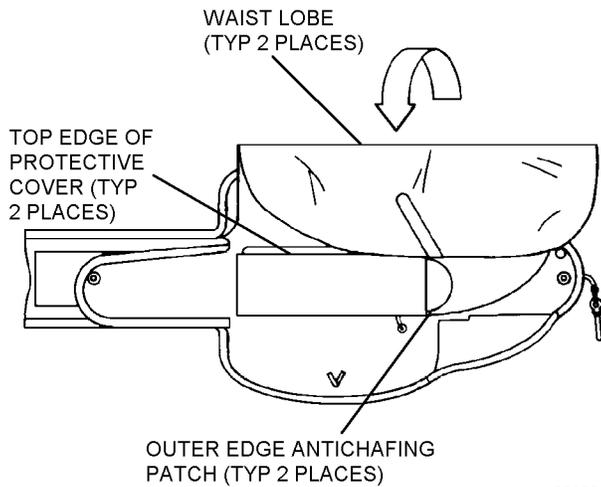


N0080012

Step 12 - Para 14-80

# NAVAIR 13-1-6.1-2

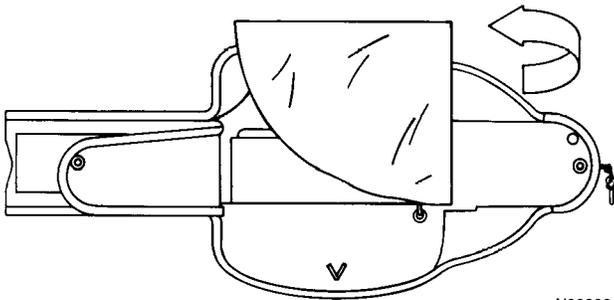
13. Fold waist lobes over to top edge of protective covers.



**Step 13 - Para 14-80**

N0080013

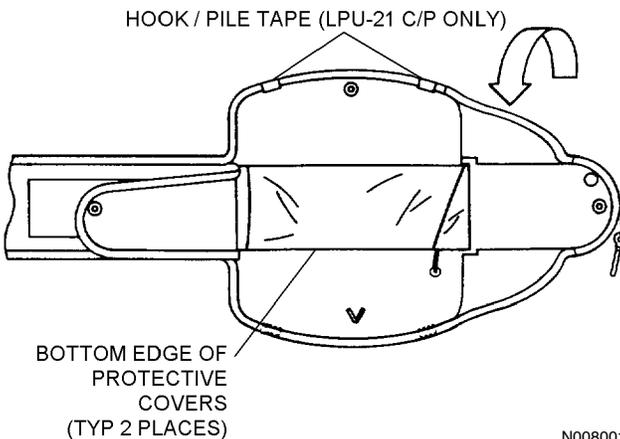
14. Fold waist lobes over to outboard edge of anti-chafing patch.



**Step 14 - Para 14-80**

N0080014

15. Fold waist lobes over to bottom edge of protective covers.



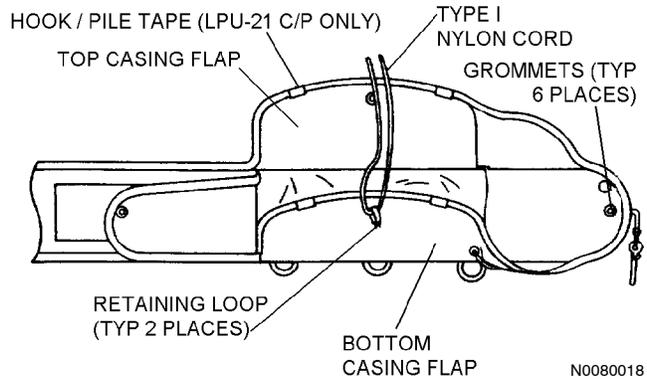
**Step 15 - Para 14-80**

N0080015

## NOTE

Packing cord shall be used to aid in closing preserver casing.

16. Fold up bottom casing flap containing retaining loop. Insert an 8-inch length of Type I nylon cord through retaining loop.



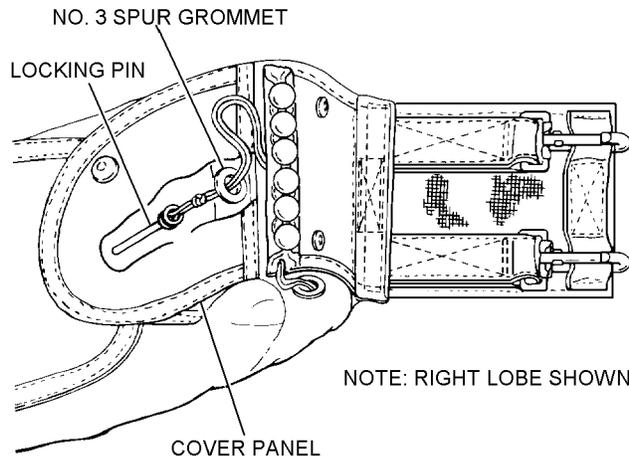
**Step 16 - Para 14-80**

N0080018

17. Pass ends of packing cord through grommet located in top casing flap. Pull retaining loop through grommet. Ensure hook and pile strips mate (LPU-21C/P only).

18. Fold inboard casing flap over, passing the packing cord through the grommet. Pull retaining loop through.

19. Route locking pin under locking pin cover flap and through No. 3 spur grommet.



**Step 19 - Para 14-80**

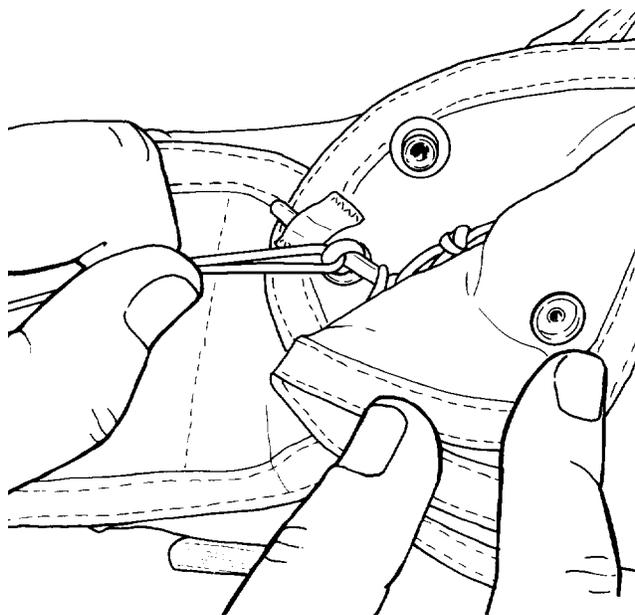
N0080019

20. (LPU-21C/P assembly.) Route locking pin through slot under locking pin cover flap. Webbing panel and spur grommet have been deleted on newly procured life preserver assemblies.

**WARNING**

To avoid possible injury when closing casing of right waist lobe, do not place palm of hand on waist closure snaphooks.

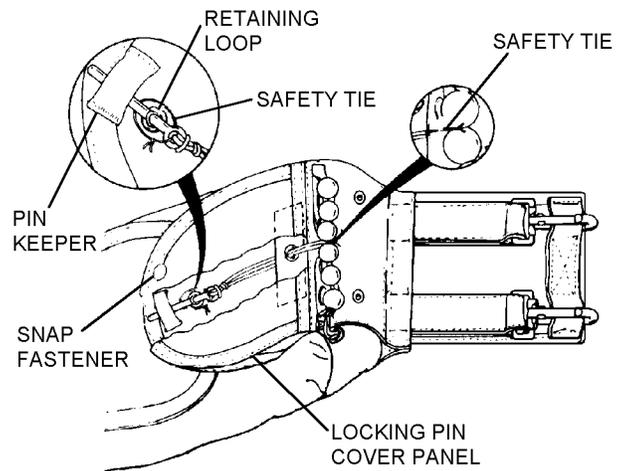
21. Fold outboard casing flap over, passing packing cord through grommet. Pull retaining loop and into pin through retaining loop and into pin keeper loop. Remove packing cord.



Step 21 - Para 14-80

N0080021

22. Safety-tie eye of locking pin to retaining loop with one turn of size A nylon thread, single. Safety-tie beaded inflation handle with one turn of size E nylon thread, single. Draw thread sufficiently to permit a 1/2 ± 1/8-inch space between middle beads and webbing on preserver. Tie ends of both safety ties with a surgeon's knot followed by a square knot.



Step 22 - Para 14-80

N0080022

23. Close locking pin cover panel.

**NOTE**

NAVAIR 13-1-6.5, Rescue and Survival Equipment, contains information on inspection and replacement of survival items.

24. When required, ensure that survival items have been inspected for expiration and damage.

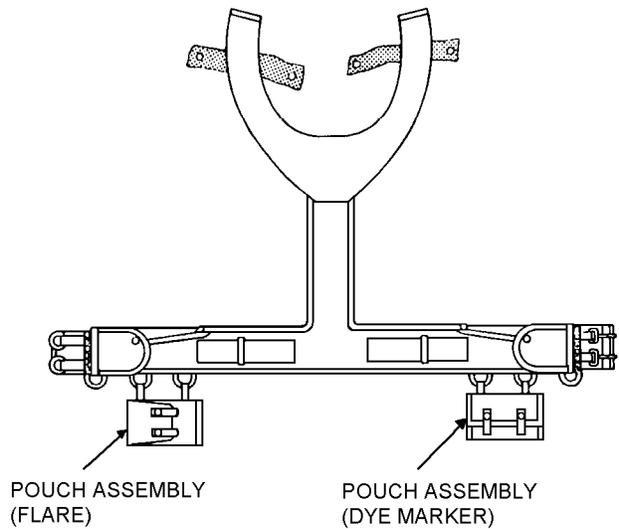
## NAVAIR 13-1-6.1-2

### NOTE

Each survival item shall be secured to the snap fastener tab of its respective pouch with a 36-inch length (DYE MARKER) or 80-inch length (FLARES) of nylon cord (MIL-C-5040, Type I). Sear ends of each cord.

25. When required, insert two dye markers into pouch labeled DYE MARKER. Insert two Marine Smoke and Illumination Signals into pouch labeled FLARES. Fake excess line and secure with rubber bands.

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



N0080025

### Step 25 - Para 14-80

## Section 14-4. Illustrated Parts Breakdown (IPB)

### 14-81. GENERAL.

14-82. This section lists and illustrates the assemblies and detail parts of the LPU-21/P Series Life Preserver Assembly.

### 14-42

14-83. The Illustrated Parts Breakdown should be used during maintenance when requisitioning and identifying parts.

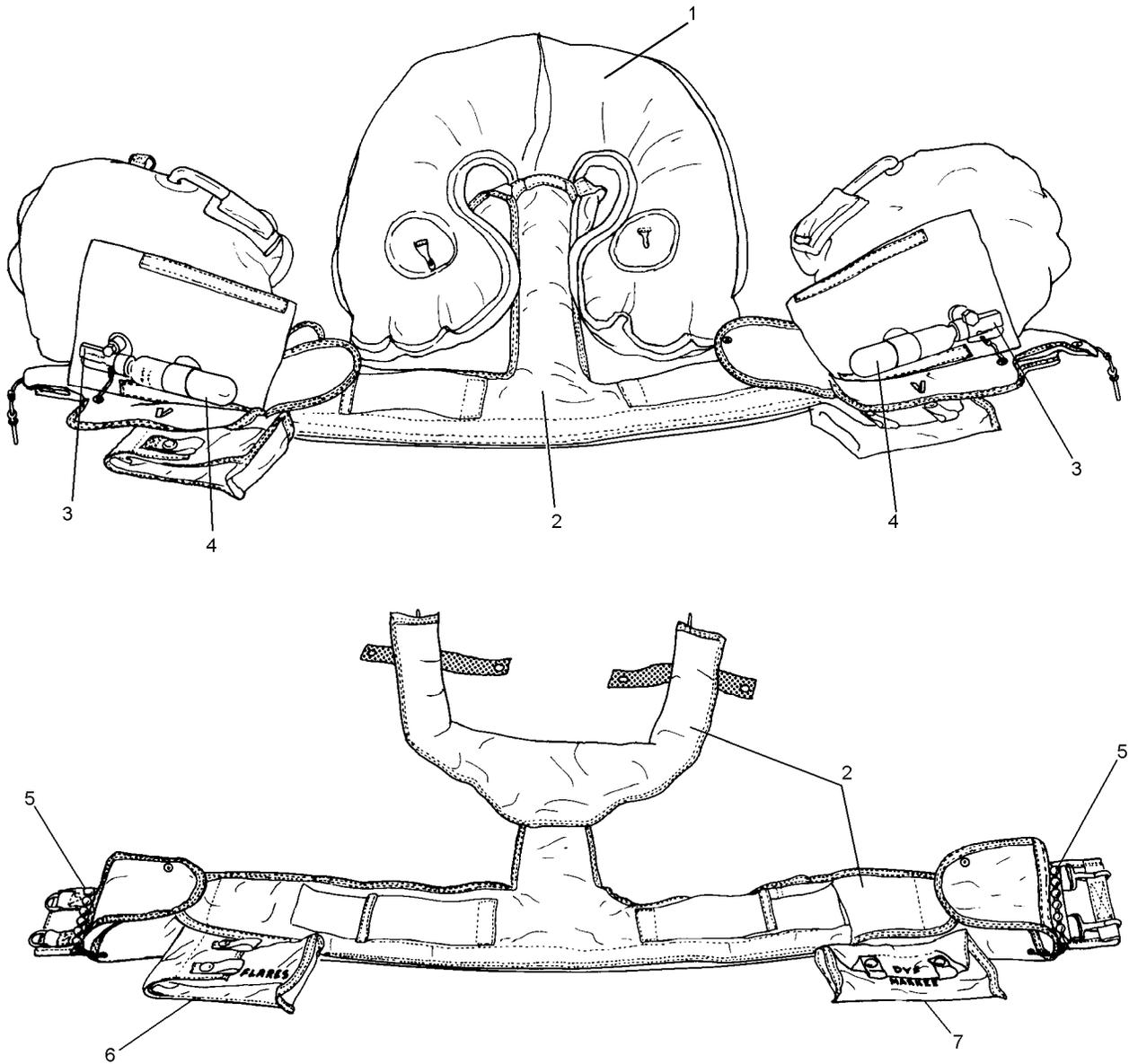


Figure 14-13. LPU-21/P Series Life Preserver, Illustrated Parts Breakdown

10140013

**NAVAIR 13-1-6.1-2**

Figure and Index Number	Part Number	Description	Units Per Assembly	Usable On Code
		1 2 3 4 5 6 7		
14-13	No Number	LPU-21/P SERIES LIFE PRESERVER . . . . .	REF	
-1	68A73H1-101 (NIIN 01-120-4894)	. INFLATABLE LIFE PRESERVER . . . . . LPU-21B/P	1	
	68A73H1-103 (NIIN 01-120-4894)	. INFLATABLE LIFE PRESERVER . . . . . LPU-21C/P	1	
-2	975AS103-301 (NIIN 01-120-4751)	. . CASING ASSEMBLY, LPU-21B/P . . . . .	1	
	975AS103-303 (NIIN 01-120-4751)	. . CASING ASSEMBLY, LPU-21C/P . . . . .	1	
-3	MIL-I-23145 (NIIN 00-012-3571)	. . INFLATION ASSEMBLY, Type II . . . . .	2	
	105AS100-3	. . . GASKET, Top (30003) (Note 2) . . . . .	1	
	105AS100-4	. . . GASKET, Bottom (30003) (Note 2) . . . . .	1	
	105AS100-2	. . . GASKET, Seat Seal (30003) (Note 2) . . . . .	1	
-4	MIL-C-25369 (NIIN 01-077-8773)	. . . CO <sub>2</sub> CYLINDER, Type III, 35 Gram . . . . .	2	
-5	975AS121-11 (NIIN 00-120-4752)	. . . BEADED INFLATION HANDLE . . . . . Type I	2	
-6	68A73D3-61 (NIIN 00-118-6187)	. . FLARE POUCH ASSEMBLY . . . . . (Note 1)	1	
-7	68A73D2-41 (NIIN 00-118-6186)	. . DYE MARKER POUCH ASSEMBLY . . . . . (Note 1)	1	
Notes:		1. Optional equipment at the discretion of the Squadron Commander.  2. Top, bottom, and seat seal gaskets are obtained from Valve Stem and Seat Seal Kit, P/N 105AS100-5, NIIN 00-498-6964, which contains two top, two bottom, and two seat seal gaskets.		

# NUMERICAL INDEX

Part Number	Figure and Index Number	SM&R Code
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MIL-C-25369	14-13-4	PAGZZ
MIL-I-23145	14-13-3	PAGZZ
105AS100-2	14-13-3	
105AS100-3	14-13-3	
105AS100-4	14-13-3	
68A73D2-41	14-13-7	PAGZZ

Part Number	Figure and Index Number	SM&R Code
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68A73D3-61	14-13-6	PAGZZ
68A73H1-101	14-13-1	PAOGG
68A73H1-103	14-13-1	PAOGG
975AS103-301	14-13-2	PAGZZ
975AS103-303	14-13-2	PAGZZ
975AS121-11	14-13-5	PAGZZ

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