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NAVAL SHIPS TECHNICAL MANUAL

CHAPTER 9331

LIFE PRESERVERS, USE AND PERIODIC TESTING OF

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NAVAL SHIP SYSTEMS COMMAND, WASHINGTON, D. C. 20360

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CHAPTER 9331 – LIFE PRESERVERS, USE AND PERIODIC TESTING OF

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SECTION 1. INHERENTLY BUOYANT LIFE-PRESERVERS

There are three types of inherently-buoyant preservers approved for Naval shipboard use; viz., vest-type fibrous glass, vest work-type foamed plastic, and yoke-type fibrous glass.

9331.1 GENERAL CONSTRUCTION OF INHERENTLY BUOYANT PRESERVERS, FIBROUS GLASS FILLED

The basic buoyant material is fibrous glass and is manufactured domestically. It is waterproofed to improve its inherent buoyancy and is naturally mildew resistant and fireproof. Fibrous glass has replaced kapok which was formerly used. (Kapok is a non-domestic natural fiber with good buoyancy characteristics, but it is also combustible and subject to mildew and rotting.) The fibrous glass is stuffed into a cotton bag to hold the material compactly in place. This also makes it easier to handle in the form of filled, separable pads. The pads are then enclosed in a "vinyl" plastic coating to protect the fibrous glass. The plastic bag has an increased total buoyancy because of entrapped air. The finished buoyant pads are placed into cotton drill outer covers which, with their necessary straps and hardware, completes the preserver.

9331.2 GENERAL CONSTRUCTION OF INHERENTLY BOUYANT LIFE-PRESERVERS, FOAMED PLASTIC FILLED

The basic buoyant material is unicellular plastic foam. The foam is naturally mildew and fire resistant, and has a low water absorption characteristic. The pads are enclosed in a cotton drill cover to which are attached the necessary straps and hardware.

9331.3 TYPES OF LIFE PRESERVERS.

1. **Vest type, fibrous glass filled, life preservers, with or without collar.** The vest type, as the name implies, is a single unit without sleeves and consists of a cotton drill outer envelope in which are enclosed the removable fibrous glass pads, providing a buoyancy of 40 or 46 pounds. The preserver is fitted with tie and tunnel tapes to provide for individual adjustment. A leg strap is attached on either side of the preserver to prevent it from riding up on the wearer when he is in the water.

Pockets are provided for the leg straps when they are not in use. A webbing body strap is attached to the preserver to facilitate lifting the wearer from the water. The strap can also be used as an attachment to other survivors or life floats and eliminates the tiring necessity of holding on by hand. The pads are removable through slide fastener openings to permit laundering of the cotton drill envelope. There are five or six pads per preserver, depending on the style. Both types have four front pads and a back pad, each enclosed in a vinyl film envelope. The sixth pad, (where used), is a collar pad and is not enclosed in the plastic film.

2. **Vest type, foamed plastic filled life preserver, work type.** The work type preserver is a lightweight preserver, foamed plastic filled, and provides 17-1/2 pounds of buoyancy. The unit is composed of three cotton drill covered sections which are assembled through a series of straps to form the completed preserver. Each section has a formed or molded pad 2 inches thick, which is notched for flexibility and to allow the preserver to more closely conform to the shape of the body. The preserver is light in weight to enable the wearer to work in comparative comfort, and is buoyant enough to keep the wearer afloat until rescued.

3. **Yoke type, fibrous glass life preserver.** The yoke type preserver is worn around the neck like a yoke collar. The preserver has five fibrous glass pads in vinyl film envelopes, two in each of the body sections and one in the collar. The preserver provides a buoyancy of 47 pounds. This type of preserver is held in place by crotch straps and a webbing waist strap. These are designed for quick release. In addition, a quick breakaway is provided between the left body section and the collar. The primary use of this type preserver is for pack carrying troops in amphibious operations.

A modification to the yoke type preserver provides a zipper opening in each section to allow easy replacement of the pads, or laundering of the outer cover as required.

9331.4 DONNING AND ADJUSTING INHERENTLY BUOYANT PRESERVERS

1. **Vest type.** Don the life preserver as you would put on a vest and adjust as shown in the series of pictures, figure 9331-1, using the following procedures:

a. Tie the front and collar tapes.

b. Pull the drawstring on the bottom, tightly around the body, to keep the preserver from sliding up when hitting the water.

c. Fit the webbing waist belt comfortably and hook it in.

d. Adjust the leg straps so the preserver will not ride up when the wearer is in the water. To save time, the straps may be adjusted when the wearer is in the water. Injured men should always have the leg straps adjusted before being lowered into the water.

2. **Work type.** Don the preserver by placing the arms through the straps connecting the body sections. Take care that the reflective tapes are visible when the preserver is on. Buckle the top clasp. Adjust the webbing belt for comfort and buckle the clasp. Figure 9331-2 shows the work type preserver properly donned.

3. **Yoke type.** The yoke type preserver is donned and adjusted as shown in the series of pictures, figure 9331-3, using the following procedure:

a. The preserver is placed about the neck and brought down in front.

b. The tie tapes at the neck should be tied in such a manner that they can be untied with one hand. A square knot never should be used.

c. The combined waist and crotch strap is passed between the legs. The waist strap then goes around to the front of the body and under the segment of the straps

Figure 9331-1. Adjusting the vest-type life preserver.

Figure 9331-2. Work-type preserver.

stitched to the preserver body. The quick-disconnect studs are closed, and the straps are comfortably and snugly tightened by pulling the body strap "D" ring tight. This arrangement makes it possible to remove the preserver without affecting the pack.

d. The preserver may be removed with one hand by using the following procedure:

(1) Untie the neck tie tape.

(2) Pull the release strap "D" ring allowing the preserver to come loose.

(3) Reach up with the left hand, grasp and pull the release placket allowing the preserver to fall free.

9331.5 STOWAGE

1. During wartime operations, life preservers are issued to the individual custody of each man aboard ship and should be worn or kept available at all times. Remaining quantities of the ship's supply, which are not issued, should be stowed above the second deck in a dry and rat-proof storeroom, not subject to excessive heat, especially avoiding close proximity to steam pipes. Dampness may induce mildew growth on the cotton drill with consequent weakening and destruction of the fabric. Prolonged storage at high temperatures may result in decreased buoyancy of the foamed plastic pads and may also cause embrittlement of the vinyl pad covering and weakening of the cotton fabric covers for the fibrous glass.

2. During peacetime, life preservers shall be stowed in ready-use lockers provided for this purpose and in the ship's boats, except that quantities in excess of those required to be in ready status for the ship's personnel and in excess of those stowed in the ship's boats may be stowed in a dry and rat-proof storeroom.

Figure 9331-3. Adjusting the york-type life preserver.

be conveniently stowed in various compartments, in quantities corresponding to the number of men normally occupying these compartments.

4. In vessels transporting troops or passengers, the entire allowance of life preservers for troops and passengers may be stowed in ready use lockers provided for this purpose. The preservers may be issued to the men for their retention at their bunks during the trip.

5. Care shall be taken in stowage after use or accidental wetting of the preserver. The preserver should be properly dried before restowing; this will reduce the possibility of mildew growth.

6. Life preservers for officers shall be stowed with those of the men of the boat or division to which they are assigned.

9331.6 CLEANING

When the outer cover of the life preserver becomes soiled, the pads shall be removed, the covers laundered and the pads reinserted. The pads should not be laundered. The vinyl film of the fibrous glass pads shall be examined for holes, and replaced if necessary. All preservers are provided with slide fastener closures to allow for easy removal of the pads. The old yoke type preserver requires slitting of the seam and restitching after reinsertion of the pads. This may be done aboard ship.

9331.7 TESTING OF LIFE PRESERVERS IN STORAGE

1. Life preservers in storage shall be kept in separate lots. For purposes of testing, a lot shall consist of not more than 3,000 preservers, manufactured at the same place and at about the same date, or previously tested at about the same date. Each lot shall be tested at intervals of not more than 1 year. Further testing shall be repeated by the ship at time of initial receipt. To reduce the proportionate cost of testing, the size of "lot" under test should always be made as large as is possible without violation of the definition of lot as previously stated. Sample should be taken from widely differing portions of the lot. Conscious effort should be made to select the poorest sample.

2. A two percent sample shall be selected (minimum sample 10, maximum sample 60) from each lot and examined visually for mildew growth, thread breakage, or other damage.

3. The pads shall be removed from the selected preservers and examined.

a. The fibrous glass, plastic film enclosed pads shall be carefully examined for water presence or mildew growth within the envelope. This shall be cause for rejection of the preserver. Stiffened, ruptured, or cracked film covers shall also be cause for rejection of the preserver. The covered pads shall be examined for small pinholes or small seam leaks by immersing in water, squeezing gently, and noting the escape of contained air from the pad. Pads with intact plastic film covers shall be considered as having satisfactory buoyancy. Small pinholes or small leaks in no more than two of the five pads in each preserver shall not be considered cause for rejection. Rejected lots shall be set aside for eventual reworking, or recovery of the fibrous glass pads.

b. The foamed plastic pads shall be examined for shape and thickness, and general condition. Rejection of any preserver shall require 100 percent inspection of the lot.

1. After issue for service, all preservers should be examined, tested and cleaned during ship overhaul.

a. All pads shall be removed from the cotton drill covers and examined as described in article 9331.7. Defective pads shall be further examined for possible salvage value and segregated according to condition.

b. Examine the preserver covers for tears, rips, missing or torn tapes, webbing and hardware. Separate out the covers needing repairs.

c. Reinstall good pads into the satisfactory covers. Pin-holes in the plastic covering the fibrous glass pads are permitted in no more than two of the five pads.

d. Rejected materials should be reworked as soon as possible to avoid possible mixups.

2. Results of the tests should be entered on the tag attached to each life preserver for this purpose.

SECTION 2. INFLATABLE LIFE PRESERVERS

9331.21 GENERAL

1. There are six types of CO_2 inflatable life preservers approved for Navy use. Five are yoke types and one is a vest type. Of the yoke types, one is the standard shipboard preserver with pouch; the second is similar but smaller and used with non-magnetic hardware for U.D.T. application; the third is a new type for special SCUBA applications with two double-cylinder inflators for ascent from greater depths than the U.D.T. type; the fourth and fifth are special for submarine use. The vest type is new and was designed primarily for carrier flight deck personnel and will be released for general shipboard use when available.

2. The two special life preservers for submarine use are intended for emergency escape. One is fitted with a hood which permits free breathing and is replacing the earlier design which is without hood. The earlier design was inflated solely by use of the oral inflation valve. The new design is inflated through a high pressure quick-connect line on the submarine through a check valve on the preserver body. Relief valves in the air chamber of the life preserver discharge into the hood with the change in pressure during ascent, to provide fresh air to the escapee.

9331.22 CARBON DIOXIDE INFLATABLE LIFE PRESERVER WITH POUCH

1. This unit is the standard shipboard inflatable preserver. The preserver consists of a buoyancy chamber, a CO_2 inflator, an oral inflation valve and tube, a lifting harness, a waist belt, a toggle-line and a pouch. The buoyance chamber is made of a sea rescue orange colored, neoprene coated nylon fabric and is inflated either by CO_2 or orally. For CO_2 inflation the lanyard is pulled down forcing the piercing pin into the 26 gram CO_2 cylinder, thereby inflating the preserver to its minimum 29 pound buoyancy. The preserver is designed to be carried in the pouch which is attached to the waist belt. The pouch normally is worn at the small of the back. Length adjustment of the belt should be made to ensure free rotation of the pouch about the waist. The preserver is equipped with a webbing lifting harness for hoisting the wearer out of the water. The lifting harness consists of a single piece of one-inch nylon webbing that is fastened at its ends to each

a loop that is snapped to the outside front of the preserver. When the preserver is properly donned for inflation, the attachment of the lifting harness to the waist is located at the small of the back and the harness passes under the arms, across the chest and through the neck opening of the preserver. A toggle line attached to the waist belt is provided for attaching the wearer to boat or float lines or to other survivors. Care should be taken to see that the CO_2 cylinder is screwed down into the holder assembly as far as possible. The set screw provided in the holder should be turned down to hold the CO_2 cylinder firmly in place.

2. To don and operate:

a. The life preserver normally is worn on the waist belt, rolled up in its pouch, and set at the small of the back.

b. Rotate the pouch from the small of the back to the stomach and unfasten the pouch flap.

c. Remove the preserver from the pouch by inserting one hand into front of pouch, holding bottom edge of pouch with free hand, pull upwards and unroll preserver up over the chest.

e. For CO_2 inflation of the preserver, pull down on the holder lanyard. This will release the CO_2 inflating the buoyancy chamber.

f. For oral inflation, or if additional inflation is desired for any reason, the following procedure is used:

(1) Remove oral inflation tube from retaining loop and turn down knurled ring as far as possible (no threads being exposed).

(2) Hold oral inflation tube with one hand and place mouth on mouthpiece.

(3) At the same instant that you blow in air, depress the mouthpiece by force of the mouth.

(4) Allow mouthpiece to release after each blow.

(5) After full inflation is obtained, the oral valve should be locked by turning the knurled ring against the mouthpiece (all threads exposed).

3. The series of pictures, figure 9331-4 shows the correct method for donning and inflating the preserver.

Figure 4: Adjustin
the Inflatable Life
Preserver

Figure 9331-4. Adjusting the inflatable life preserver.

PRESERVER (UDT)

1. The preserver consists of a buoyancy chamber, CO_2 inflator and an oral inflation valve and tube. The buoyancy chamber is made of a deck-gray-colored neoprene coated nylon fabric and is inflated either by CO_2 or orally. The 18 gram CO_2 cylinder will inflate the preserver to its full 19 pound buoyancy. All hardware, including the CO_2 cylinder is non-magnetic. The preserver is worn deflated, with the wearers neck through the collar. The preserver is strapped in use position with a nylon harness and is adjusted to the wearers size by two sets of "D" rings on the underside of the preserver.

2. To don and operate:

a. Pass head through the collar of the preserver.

b. Bring straps behind shoulders to waist level.

c. Adjust to body by placing the straps through the "D" rings and tighten.

d. For CO_2 inflation of the preserver, pull down the holder lanyard. This will release the CO_2, inflating the preserver.

e. For oral inflation, or if additional inflation is desired for any reason, the following procedure is used:

(1) Remove oral inflation tube from retaining loop and turn down knurled ring as far as possible (no threads being exposed).

(2) Hold oral inflation tube with one hand and place mouth on mouthpiece.

(3) At the same instant that you blow in air, depress the mouthpiece by force of the mouth.

(4) Allow mouthpiece to release after each blow.

(5) After full inflation is obtained, the oral valve should be locked by turning the knurled ring against the mouthpiece (all threads exposed).

f. Figure 9331-5 shows the preserver properly donned and inflated.

Figure 9331-5. UDT inflatable life preserver.

SERVER (SCUBA DUAL INFLATION SYSTEM)

1. The preserver consists of dual buoyancy chambers, two CO_2 inflation systems, two oral inflation valves and tubes, and four pressure relief valves. All hardware is non-magnetic. CO_2 cylinders, which are installed by the wearer, are magnetic or non-magnetic depending on the particular application. Inflation of the buoyancy chambers by both of the CO_2 inflation systems will completely fill the preserver to its 55 pound maximum buoyancy. Excess CO_2 will pass off through the relief valve. The preserver is worn deflated with the collar around the wearer's neck. The preserver is strapped in the use position with the nylon harness and is adjusted to the wearer's size by two sets of "D" rings on the underside of the preserver.

2. To don and operate:

a. Pass head through the collar of the preserver.

b. Bring straps behind shoulders to waist level.

c. Adjust to body by placing the straps through the "D" rings and tighten.

d. For CO_2 inflation of the preserver, pull down the holder lanyard. This will release the CO_2, inflating the preserver.

e. For oral inflation, or if additional inflation is desired for any reason, the following procedure is used:

(1) Remove oral inflation tube from its retaining loop and turn down knurled ring as far as possible (no threads being exposed).

(2) Hold oral inflation tube with one hand and place mouth on mouthpiece.

(3) At the same instant that you blow in air, depress the mouthpiece by force of mouth.

(4) Allow mouthpiece to return after each blow.

(5) After full inflation is obtained, the oral valve should be locked by turning the knurled ring against the mouthpiece (all threads exposed).

9331.25 INFLATABLE LIFE PRESERVER WITH POUCH (FOR USE BY SUBMARINE PERSONNEL)

1. The preserver consists of a single buoyancy chamber, an oral inflation valve and tube, two dual-setting pressure relief valves, a set of nose clips, a lifting harness, a waist belt, a toggle line and a pouch. The buoyancy chamber is a sea-rescue orange-colored neoprene-coated nylon fabric and is inflated through the oral tube while in the disabled, pressurized submarine. The preserver is designed to be carried in the pouch which is attached to the webbing waist belt. Normally, the preserver is stored. The preserver is equipped with a webbing lifting harness for lifting the wearer out of the water. The lifting harness consists of a single piece of one-inch nylon webbing that is fastened at its ends to each side of the waist buckle and is crossed over to form a loop that is snapped to the out side front of the preserver. When the preserver is properly donned for inflation, the attachment of the lifting harness to the waist is located at the small of the back and the harness passes under the arms, across the chest, and through the neck openings of the preserver. A toggle line is provided for attaching the wearer to boat or float lines or to other survivors.

2. To don and operate:

a. Place webbing belt around waist, pouch in front and adjust for comfort.

one hand into the front of the pouch, holding the bottom edge of the pouch with the free hand, pull upwards and unroll preserver up over the chest.

c. Pass head through the collar of the preserver.

d. Remove oral inflation tube from the retaining loop and turn down knurled ring as far as possible (no threads exposed).

e. Hold oral inflation tube with one hand, and bring the nozzle of the submarine's compressed air line to the oral mouthpiece.

f. At the same instant the air is released from the compressed air line, depress the mouthpiece by moving hands closer together.

g. Allow mouthpiece to release when preserver is inflated.

h. After full inflation is obtained, the oral valve should be locked by turning the knurled ring against the mouthpiece (all threads exposed).

i. Put on nose clips.

j. Exit from submarine, exhale and ascend to the surface, "blowing" continuously.

9331.26 INFLATABLE LIFE PRESERVER, HOODED, WITH POUCH (FOR USE BY SUBMARINE PERSONNEL)

1. This preserver is intended to replace the present preserver discussed in article 9331.25 above. The preserver is similar to the other unit, differing as follows:

a. An adapter and check valve are provided for filling the preserver from the ships compressed air supply without the oral inflation system.

b. A hood, integral with the preserver body, covers the head after it has passed through the collar.

c. A snorkel, passing through the hood, is provided for breathing while in the escape trunk, during the pressurization of the escape trunk prior to escape.

d. The dual setting relief valves have been changed to single setting units and have been relocated to exhaust into the hood.

2. To don and operate:

a. Place nylon webbing belt around waist, pouch in front, and adjust for comfort.

b. Remove the preserver from the pouch by inserting one hand into front of the pouch, holding the bottom edge of the pouch with the free hand, pull upwards and unroll preserver up over the chest.

c. Put on nose clip.

d. Pass head through the collar of the preserver.

e. Grip snorkel mouthpiece between teeth and breathe through mouth. Continue breathing through snorkel during pressurization of the escape trunk.

f. Put quick connect fitting onto check valve adapter and inflate the preserver. When new preservers are received, check for correct mating.

g. After full inflation is obtained, remove the quick connect. Full inflation has occurred when excess air escapes through the pressure relief valve.

h. Close snorkel and remove snorkel mouthpiece from mouth.

i. Exit from submarine and ascend to the surface, breathing in a normal manner except through the mouth.

tective tape covering the slide fastener, open the slide fastener and throw back the hood from the head.

k. Figure 9331-6 shows the preserver properly donned and partially inflated.

9331.27 STOWAGE, CLEANING AND CARE OF LIFE PRESERVERS ON BOARD SHIP

1. Heat, moisture and light contribute materially to the deterioration of rubber compounds, cloth and thread. It is essential that the life preservers be stored or stowed in a cool dry place.

2. Oil and paint accelerate deterioration, thus preservers must be kept away from oil, paint, and greasy substances.

3. Do not wash the preservers in a commercial dry cleaning solvent. Use only a mild soap solution for cleaning.

4. Sharp edges increase wear and tear. Storage, therefore should be such that this kind of damage is kept to a minimum.

5. CO_2 cylinders should not be stored near steam lines or radiators. It is advisable, also, to keep the cylinders free from moisture. A light oil film will help to preserve cylinders not installed in preservers.

9331.28 DRYING

After immersion, the preserver should be rinsed in clean water and dried thoroughly before it is stowed away. It should not come in contact with hot steam pipes, radiators, or other hot surfaces. If inflated, it will dry more quickly. However, the preserver should be inflated orally to conserve CO_2 cylinders.

Figure 9331-6. Inflatable life preserver for use by submarine personnel.

IN STORAGE AND WHEN RECEIVED INITIALLY ON BOARD SHIP

1. Inflatable life preservers in storage at supply depots should be tested every twelve months to afford protection against the issue of "bad" lots of preservers which would result in a ship or activity having insufficient usable preservers for all hands. All preservers shall be separated into lots of preservers manufactured on or about the same date and of material of the same composition, or tested previously at the same time. For large quantities of preservers it will be adequate to separate the lots in accordance with the contract numbers shown on the cartons. For purposes of testing, a lot shall consist of not more than 3,000 preservers. To reduce the proportionate cost of testing, a lot should be made as large as possible without violation of the definition of lot as previously stated. Samples should be taken from widely differing portions of the lot. Conscious effort should be made to select the poorest samples.

2. A two percent sample shall be selected (minimum sample 10, maximum sample 60) from each lot and tested as below.

3. If the lot is rejected based on the sample taken, a 100 percent examination shall be performed and all bad preservers shall be scrapped.

4. The sample preservers shall be tested in the following manner:

a. Inflate the preserver to its normal inflation with compressed air through the opening where the CO_2 cylinder is normally placed. Control the flow of compressed air with a valve in the air supply, being careful not to damage the preserver by over-inflation.

b. Examine all mechanical gear on the preserver to ensure that it is in good working order.

c. Check that the tip of the piercing pin has not been bent or otherwise damaged.

d. Deflate the preserver through the oral tube. Reinflate the preserver through the oral tube with compressed air controlled by a valve in the same manner and with the same precautions as in "a," above.

e. Submerge the inflated preserver in water and examine for leaks. Rinse in clean water. Allow to dry thoroughly, accelerating the drying with compressed air if necessary.

f. Deflate the preserver using a vacuum device to assure complete deflation. Repack the preserver.

5. Preservers that leak, or show indications of poor workmanship such as defective seams shall be rejected.

9331.30 TESTING OF INFLATABLE LIFE PRESERVERS IN SERVICE

1. To ensure that serviceable life preservers are furnished to all personnel, shipboard personnel should test all inflatable preservers as soon as they are received on board in accordance with article 9331.29 and the following: CO_2 inflatable preservers are issued with three CO_2 cylinders for each inflation system. One is for test purposes, one for general use, and one is a spare. Used cylinders should be replaced immediately.

2. The inflatable type preserver should be inspected yearly. These inspections should include inflating the preserver orally or with compressed air in accordance buoyancy chamber or inflation system. The piercing pin of the CO_2 inflator should be checked to see that it is not bent and that it is in good working condition. CO_2 cylinders must be weighed semi-annually to ensure that they have not been punctured and lost any charge. Cylinders weighing three grams (or more) below the gross weight marked on the cylinder, should be discarded and replaced with full cylinders. All mechanical gear on the preserver should be checked to ensure that it is in good working condition. Flashlight batteries should be replaced semi-annually.

3. Preservers with leaks or other defects should be repaired as soon as possible to assure that good preservers are available whenever they may be required. Defective preservers that cannot be repaired by the ships force should be replaced as soon as practical. Holes in the buoyancy chamber can be repaired by the ships forces with a repair kit.

4. Before a preserver is donned for normal use, the wearer should assure himself that the preserver has not developed any leaks since its previous use. This can be done by orally inflating the preserver and examining for leaks. Submersion is not essential for this operation.

9331.31 ABANDON SHIP PROCEDURE

1. For survival it is best that persons abandoning ship remain fully clothed. If possible, personnel are to get away from the ship in a lifeboat. If it is impossible to leave the ship on a lifecraft, personnel should lower themselves into the water using a hose or line, being sure it is firmly anchored before lowering themselves. If a choice is available, personnel should leave the ship on the windward side from whichever end of the ship is lower. If it is necessary to jump into the water, do so with the legs together and the body erect. The inherently-buoyant type life preservers should be fastened together and kept close to the body by folding the arms across the chest and gripping the jacket with the fingers. The object of this procedure is to prevent the buoyant preserver from riding up and striking the chin or neck when the man hits the water. If an inflatable preserver is being worn, it should not be inflated until the man is in the water. The same procedure should be followed for jumping with an uninflated preserver as with the inherently buoyant preserver. The preserver should be inflated as soon as the man is in the water.

2. When in the water, survivors should swim away from the ship as rapidly as possible and climb into a lifeboat if it is available. If depth charges or underwater explosions are occurring in the vicinity, survivors should swim or float on their backs, keeping their heads and chests as far out of the water as possible. This is because underwater explosions are particularly dangerous to body cavities such as the lungs, abdomen, sinuses, and eardrums, causing damage through the explosion's concussion waves.

3. If the ship is entirely surrounded by burning oil and abandonment is absolutely essential, the life preserver and shoes should be discarded. A man should jump feet first through the flames, and swim as long as he can to the windward, under the surface of the water. When the air in the lungs is exhausted, he should spring above the water in a vertical position, push the flames away with a circular,

back to the wind, submerge feet first in a vertical position and swim under the surface again. This procedure should be repeated until he is clear of the burning oil.

9331.32 WATERTIGHT FLASHLIGHT FOR LIFE PRESERVERS

1. To provide a means for more readily detecting men on the surface of the water at night during "Abandon ship" operations, small watertight battery-powered lights have been developed for use with life preservers. The light consists of a single cell battery case to which is attached a safety pin, a clear lens, and a bulb. The lens is dome shaped to provide 360-degree horizontal visibility as well as visibility from above. These lights are worn by the personnel when the life preservers are in use and stowed with the life preservers when not in use.

2. To prevent damage to the inflatable chambers or vinyl-covered pads of the life preservers, the following recommendations are made for attaching the inherently-buoyant life-preserver lights.

of the inflatable life preserver.

b. Attach a light only in the tab provided for the purpose.

c. Where tab has been damaged, or on older preservers that may not have the tab available, the light should be attached to clothing near the top of the shoulder. The light may also be attached to the cotton drill taking care not to pierce the vinyl covering on the pads.

3. Each light should be fitted with a standard flashlight cell (available from general stores) and should be checked quarterly by turning on the light momentarily to ensure that the light is in working order. Since flashlight cells deteriorate with age, these cells should be replaced at approximately six month intervals.

4. Personnel should not use life preserver lights except during "Abandon ship" operations. Use of the light will cause premature failure during the time it is required.