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SUPERSEDING
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MILITARY SPECIFICATION

LIFE RAFT, INFLATABLE, ONE MAN, VEE BOTTOM, LRU-18/U

This specification is approved for use within the Naval Air Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers requirements for one type of a one man, vee bottom, inflatable life raft with inflation equipment designated as LRU-18/U.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the Issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-B-1055	-	Barrier Material, Waterproofed, Flexible
PPP-T-76	-	Tape, Pressure-Sensitive Adhesive, Packaging/paper(For Carton Sealing)

MILITARY

MIL-P-116	-	Preservation, Methods of
MIL-I-23145	-	Inflation Assemblies, Life Preserver
MIL-C-52053	-	Cylinder, Carbon Dioxide, 2 Ounce, Capacity
MIL-O-81375	-	Oral Inflation Assembles, Survival Equipment, Inflatable

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Air Engineering Center, Systems Engineering and Standardizations Department (SESD), (Code 53), Lakehurst, NJ, 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC-N/A FSC-4220

STANDARDS

FEDERAL

FED-STD-191	Textile Test Methods
FED-STD-751	Stitches, Seams and Stitching

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property

2.1.2 Drawings and publications. The following Government drawings form a part of this specification to the extent specified-herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

NAVAL AIR SYSTEMS COMMAND

105AS100	-	Gaskets, and Gasket Replacement Kits
1106AS111	-	Tag, Warning, Inflatable Life Preservers and Life Rafts
1521AS102	-	Life Raft Assembly, Inflatable, One Man, VEE Bottom, Type LRU-18/U
1521AS103	-	Patterns, Life Raft, Inflatable, One Man, VEE Bottom, LRU-18/U
1521AS104	-	Details, VEE Bottom Life Raft
1521AS105	-	Manifold Stem Assembly
1521AS200	-	Folding Procedure, Life Raft, Inflatable, One Man, VEE Bottom, LRU-

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

DEPARTMENT OF TRANSPORTATION

CODE OF FEDERAL REGULATIONS

49 CFR Department of Transportation

(Application for copies of the Department of Transportation Code of Federal Regulations (CFR) should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specifcation shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification. The LRU-18/U vee bottom inflatable life raft furnished under this specification shall be a product which is authorized by the qualifying activity for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

3.2 First article. When specified in the contract or purchase order, samples shall be subjected to first article inspection (see 4.4. and 6.4).

3.3 Materials and components. The materials and components shall conform to the applicable specifications, standards and drawings as listed or required herein (see 6.2. 11(1)). Unless otherwise specified, the materials and components, except for metallic parts, used in the construction of the life raft shall have been manufactured not more than 18 months prior to the date of delivery of the life rafts (see 6.2.11(2)).

3.4 Design. The life raft shall consist of two separate cellular flotation chambers. Inflation of the upper second, third and fourth cells shall be by a carbon dioxide Inflation system and an oral inflation system. The remaining cells shall be Inflated by an oral Inflation system. All life raft seams, and inflation system attachments (carbon dioxide and oral), shall be secured by heat sealing. No repair patches shall be used in the construction of the life raft.

3.5 Construction. The construction of the life raft and its components shall be in accordance with the requirements of this specification and drawing 1521AS102.

3.5.1 Patterns. The panels for the llfe raft shall be cut in strict accordance with the pattern drawing 1521AS103 furnished by the Government (see 6.5). The Government pattern drawings shall not be altered in any manner and shall be used for making the working patterns. The working patterns shall be identical to the Government furnished pattern drawings.

3.5.2 Seams. Unless otherwise specified in the contract, all seams shall be heat sea led in accordance with applicable drawing requirements.

3.5.3 Cut edges. All of the cut edges of uncoated, nylon, fibrous materials shall be seared to prevent fraying. No sharp edges shall be formed.

3.5.4 Oral inflation assembly. The oral Inflation assemblies shall be in accordance with MIL-O-81375. Type, class and style of the assembly components, and the location of the assembly on the life raft shall be in accordance with the applicable drawing requirements.

3.5.5 Carbon dioxide inflation assembly. The carbon dioxide inflation assembly shall be in accordance with MIL-I-23145, except that it shall not contain a lanyard. The type of assembly and its location on the life raft shall be in accordance with the applicable drawing requirements.

3.5.5.1 Carbon dioxide cylinder. The carbon dioxide cylinder furnished with the life raft shall conform to MIL-C-52053.

3.5.5.2 Manifold stem. The manifold stem assembly shall be in accordance with drawing 1521AS105. Attachment to the life raft shall be achieved by heat sealing at the location specified in the applicable drawing.

3.5.5.2.1 Gaskets. Gasket for the inflator assembly shall be in accordance with drawing 105AS100. Each gasket shall be dimensionally checked prior to installation (see 4.8.1.1.1).

3.5.5.3 Diffuser. A diffuser, fabricated in accordance with drawing 1521AS104, shall be located on the life raft as specified in drawing 1521AS102. The diffuser shall in no way interfere with the heat welds for the carbon dioxide cell.

3.5.5.4 Carbon dioxide cylinder cover. A carbon dioxide cylinder cover, fabricated In accordance with drawing 1521AS104, shall be located on the life raft as specified in drawing 1521AS102.

3.5.6 Scuff panel. A scuff panel, fabricated in accordance with drawing 1521AS103, shall be located on the life raft as specified in drawing 1521AS102. Attachment shall be by cementing (see 3.5.7).

3.5.7 Use of adhesive. When the use of adhesive is specified (see 3.5.6), the surfaces to be joined shall be thoroughly cleaned with a suitable solvent so that the dusting materials (zinc stearate or talc) and any other surface contaminants are removed. Care shall be exercised to assure that the coating and base undercloth are not damaged and the adhesive between both is not Impaired in any way by prolonged exposure to the solvent. The solvent used shall evaporate completely prior to the application of the adhesive, and shall leave no residue. The cemented areas shall not contain any voids, channels, or excessive wrinkles. The adhesive shall be controlled to insure that old adhesive or adhesive which has partially or completely polymerized is not used. A fresh batch of the adhesive shall be used at least every eight hours during the course of manufacture. The containers for the adhesive shall be free from congealed adhesive before being refilled. Care shall be taken to ensure that the adhesive is completely dry prior to folding the life raft to preclude adhering of the life raft sides to each other.

3.5.8 Stitching. Stitching is limited to the fabrication of the diffusor (see 3.5.5.3), the carbon dioxide cylinder cover (see 3.5.5.4) and pocket assembly. All sewing shall be accomplished with Stitch Type 301 conforming to

FED-STD-751 and shall contain 6 to 10 stitches per inch. The ends of the stitching shall be backstitched by overlapping on Itself with continual stitching for not less than 1/2 inch. Thread breaks, skips, and run-offs shall be overstitched not less than one inch. Proper thread tension shall be maintained so that there shall not be any loose or overly tight stitches. All thread ends shall be trimmed to a length not greater then 3/8 inch.

3.6 Color. The color of the life raft and components shall be as specified in the applicable drawings.

3.7 Markings. Markings shall be in accordance with MIL-STD-130 and applicable drawing requirements. Ink, color, size, and location of the markings shall be as specified therein. Letters and numerals, 1/4 Inch or less in height, shall not be stencilled. All markings shall be legible, durable, permanent, and thoroughly dry prior to folding, preservation, and packing.

3.7.1 Serial numbers. Each life raft shall be identified by a serial number which will be assigned by the manufacturer. Serialization shall be achieved by a block of consecutive numbers to cover the entire acquisition quantity. Markings shall be in accordance with 3.7.

3.7.2 Warning tag. A warning tag conforming to drawing 1106AS111 strung with twine, shall be securely tied around the carbon dioxide manifold. Attachment shall be in such a manner that will make the tag conspicuous.

3.8 Performance characteristics.

3.8.1 Operation (carbon dioxide). The life raft, when inspected for operation as specified in 4.8.2, shall inflate to its design shape, as shown in drawing 1521AS102. It shall inflate to its design shape in not more than 30 seconds without any evidence of Impediment or blockage to the flow of the carbon dioxide gas or restriction by any component. The life raft shall not show any evidence of material or construction failure. The corrected pressure shall be not less than .25 pounds per square inch gauge (psig) nor more than 2.0 psig.

3.8.2 Pressure. The pressure in the life raft carbon dioxide chamber shall be not less than 4.75 psig, when inspected as specified in 4.8.3. All the seams shall remain perfectly intact. There shall be no evidence of construction or material failure in any respect.

3.8.3 Leakage. When tested as specified in 4.8.4, 4.8.4.1, and 4.8.4.2, the pressure in the chamber being tested shall not be less than 1.60 psig. All the seams shall remain perfectly intact and there shall be no evidence of material or construction failure in any respect; nor shall there be any distortion or twisting of the chamber. The oral inflation valve when depressed shall operate without restriction to the flow of air and shall shut off the flow of air completely when released.

3.8.4 Weight of the life raft. When weighed as specified in 4.8.5, the life raft shall weigh not more than 4.2 pounds.

3.8.5 Strength of attachment of the manifold stem and the oral inflation assemblies. When tested as specified in 4.8.6, there shall be no evidence of material or construction failure in any respect.

3.8.6 Thermal seam bonding. When Inspected as specified in 4.8.7, the force required to separate each thermal seam specime shall not be less than 40 pounds.

3.8.7 Extreme temperature.

3.8.7.1 At zero 'Fahrenheit (minus eighteen "Celsius). When tested as specified In 4.8.8.1, the life raft shall inflate to design shape within twenty minutes. Inflation shall be without any hindrance to the flow of carbon dioxide or restriction by any component or accessory. All the seams and cemented attachments shall remain perfectly intact and shall show no evidence of separation. There shall be no evidence of construction or material failure in any respect.

3.8.7.2 At one hundred sixty 'Fahrenheit (seventy one 'Celsius). When tested as specified in 4.8.8.2, the life raft shall Inflate to design shape within thirty seconds. Inflation shall be without any hindrance to the flow of carbon dioxide or restriction by any component or accessory. All the seams and cemented attachments shall remain perfectly intact and shall show no evidence of separation. There shall be no evidence of construction or material failure in any respect.

3.9 Visual examination and dimensions. When visually examined and dimensionally checked as specified in 4.8.1.1, the life raft and its components shall conform to this specification and applicable drawings,

3.10 Folding. The life raft shall be folded in accordance with drawing 1521AS200. The oral inflator assemblies shall lie flat and point in their proper directions.

3.11 Workmanship. After completion of the final assembly, the life raft shall be thoroughly cleaned and all loose thread, lint, and foreign matter shall be removed. The metal components shall not be misaligned nor contain any sharp edge, crack, dent, nick, burr, or sliver. The life raft shall not contain any spot, stain, non-specified hole, abraded area, tear, cut, mend, or needle chew. Because of the emergency and life support use of this equipment, the importance of providing a product of uniform excellent quality cannot be overemphasized. The life raft shall be uniform in quality and shall be free from irregularities or defects which could adversely affect performance, reliability, or durability. The life raft shall conform to the quality grade of product established by this specification. The occurrence of defects shall not exceed the acceptance criteria established herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibllity for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification, where such Inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspections set forth in this specification shall become

a part of the contractor's overall Inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of Inspections The Inspections specified herein are classified as follows:

a. Qualification inspection (see 4.3).

b. First article inspection (see 4.4).

c. Quality conformance inspection (see 4.5).

d. Quality conformance verification inspection (see 4.6).

4.3 Qualification inspection. The qualification inspection of the life rafts shall consist of examinations and tests specified in table I.

4.3.1 Qualification samples. The qualification inspection samples shall consist of three life rafts and three sets of top and bottom gaskets (packaged separately) . The qualification samples shall be forwarded to the test facility set forth in the letter of authorization to submit samples (see 6.3). Each sample shall have a tag attached containing the following information:

a. Sample for qualification inspection

b. LIFE RAFT, INFLATABLE, ONE MAN, VEE BOTTOM, LRU-18/U

c. Manufacturer's designation or number

d. Name of manufacturer

e. Submitted by (name) (date) for qualification inspection in accordance with the requirements of MIL-L-85824(AS) under authorization (reference authorizing letter and number) (see 6.3)

4.3.2 Retention of qualification. The retention of qualification shall consist of periodic verification to determine compliance of the qualified one man inflatable life rafts with the requirements of this specification. Periodic verification shall be by certification unless otherwise specified by the activity responsible for the Qualified Products List and shall be at intervals of not more than two years.

4.4 First article.

4.4.1 First article Inspection. The first article inspection of the life rafts shall consist of the examinations and tests specified in table II. The examinations and tests shall be performed in the sequence listed.

4.4.2 First article samples. Unless otherwise specified in the contract, as soon as practicable after award of the contract or purchase order, the

manufacturer shall submit three life rafts and three sets of top and bottom gaskets (packaged separately). The samples shall be representative of the construction, workmanship, components and materials to be used during production. When a manufacturer is in continuous production of these life rafts from contract to contract, submission of further first article inspection samples on the new contract may be waived at the discretion of the acquiring activity (see 6.2.lf). Approval of the first article inspection samples or the waiving of the first article inspection does not exclude the requirements for performing the quality conformance Inspection. The first article inspection samples shall be furnished to the Government as directed by the' contracting officer (see 6.2. lg).

4.4.3 First article report. Upon completion of the first article inspection program, the Government activity responsible for conducting the Inspection program (see 6.2.lg) shall report the results of the Inspection program to the contracting officer, with appropriate recommendations.

4.4.4 First article sample disposition. Upon completion of the first article inspection program, sample disposition shall be as follows:

a. One set of samples shall be returned to the manufacturer for reference in monitoring production.

b. One set of samples shall be retained by the Inspection laboratory for reference during quality conformance verification inspection (see 4.6) and shall be returned to the manufacturer with the samples from the final production lot.

c. One set of samples will be destroyed during the test program and should not be considered as part of the quantity to be delivered under the contract.

4.5 Quality conformance inspection. The sampling and inspection levels shall conform to MIL-STD-105. The quality conformance Inspection shall consist of the following:

a. Visual examination of the life rafts

b. Dimensional check of the life rafts

c. Operation (carbon dioxide)

d. Pressure

e. Leakage

f. Weight of the life raft

g. Packaging

h. Dimensional check of the top and bottom gaskets

4.5.1 Sampling.

4 5.1.1 Inspection lot.

4.5. 1.1.? Life rafts. An inspection lot size shall be expressed in units of one life raft made essentially under the same conditions and from the same materials and components. The sample unit shall be one life raft.

4.5. 1.1.2 Packacging. An inspection lot size shall be expressed in units of one fully prepared shipping container, containing life rafts, fully prepared for dellvery-using essentially-the same materials and components. The sample unit, fully prepared for delivery, need not be sealed.

4.5.1.2 Sampling for tests and examination of the life rafts and packaging. The sample size, acceptance criteria, tests, and examinations required for the life rafts and packaging, as applicable, shall be as specified in table III.

4.6 Quality conformance verification inspection at an inspection facility. Upon completion of the tests and examinations specified in 4.5.1.2, a random sample shall be selected from each lot in accordance with MIL-STD-105, Inspection Level 5-3, (see 6.2.11). The sample size shall be based only on the applicable sample size code letter corresponding to the Inspection Level S-3. Each life raft selected as a sample unit shall be identified by its assigned serial number (see 3.7.1), and shall be forwarded to the Government laboratory specified in the acquisition document (see 6.2.lb), for the following tests and examinations (listed sequence mandatory):

TESTS AND EXAMINATIONS

WEIGHT	(3.8.4 and 4.8.5)
OPERATION (CARBON DIOXIDE)	(3.8.1 and 4.8.2)
LEAKAGE	(3.8.3 and 4.8.4)
VISUAL EXAMINATION	(3.9 and 4.8.1.1)
DIMENSIONAL CHECK	(3.9 and 4.8.1.1)

The serial number of the units in the lot, represented by the sample units, shall be furnished to the Government laboratory. The initial cost of tests and examinations will be borne by the Government, however, the cost of tests and examinations of sample units resubmitted from a reworked lot, or from a new lot which may be necessitated by the rejection of a previous lot, shall be borne by the contractor. Sample units from a rejected lot shall not be resubmitted for tests and examinations without the approval of the contracting officer. Upon completion of testing, the sample units will be returned to the contractor at the contractor's expense. The Government activity responsible for conducting the inspection program (see 6.2.lh) shall report the results of tests and examinations to the designated inspection and acceptance office specified in the acquisition document. Final acceptance is based upon successful completion of the inspection program by the cognizant Government quality assurance representative/ specialist; applying the applicable acceptance criteria specified in table III .

4.7 Inspection conditions.

4.7.1 Atmospheric conditions. Unless otherwise specified in the contract, all the inspections required by this specification shall be conducted at an atmospheric pressure of 28 to 32 inches of mercury and at a temperature of 77 ± 18 degrees Fahrenheit (25 ± 10 degrees Celsius). If the final values of the ambient temperature or barometric pressure, at the end of the 4 hour wafting period of the leakage Inspection (see 4.8.4) are different from the initial values recorded at the start of the inspection, the following corrections shall be made to the final pressure readings in psig.

4.7.1.1 Temperature correction. For each degree Fahrenheit rise in temperature 0.031 psig shall be subtracted from the final pressure reading. For each degree Fahrenheit drop in temperature, 0.031 psig shall be added to the final pressure reading. The corresponding correction per degree Celslis is 0.056 psig.

4.7.1.2 Barometric pressure correction. For each 0.1 inch of mercury rise in barometric pressure, 0.049 psig shall be added to the final temperature-corrected pressure reading. For each 0.1 inch of mercury drop in barometric pressure, 0.049 psig shall be subtracted from the final temperature-corrected reading.

4.7.2 Pressure measurement. The pressure shall be measured by means of a mercury manometer or gauge calibrated in tenths psig or tenths inches of mercury. Inches of mercury can be converted to psig by multiplying the inches of mercury by 0.049.

4.7.3 Inspection area and equipment. The area in which the life rafts are Inspected, shall be adequately protected to preclude damage to the units. The area and inspection equipment shall be free of sharp or rough edges, burrs, protrusions, and anything else which will cut, tear or damage the life raft or components.

4.7.4 Air. When use of air is specified in an inspection, the air used shall not contain any oil, water or water vapor.

4.8 Inspection methods.

4,8.1 Visual examination.

4.8.1.1 Life rafts. Every life raft shall be examined visually for critical defects to determine conformance to this specification. Each life raft, selected as a sample unit from the lot, shall be thoroughly checked dimensionally and examined visually for minor defects to determine conformance to this specification. The classification and list of defects, tables IV and V, as applicable, shall be used to classify and enumerate the defects found.

4.8. 1.1.1 Gaskets. Each top and bottom gasket shall be visually examined and dimensionally checked for conformance to 3.5.5.2.1 prior to Installation. Table IV shall be used to classify the defects found.

4.8.1.2 Packaging. Each of the fully prepared shipping containers, containing life rafts, selected as a sample unit from the lot, shall be visually examined to determine that the preservation, packing, folding, and marking conform to this specification. The list of defects, table VI, shall be used to enumerate the defects found.

4.8.2 Operation (carbon dioxide). The life raft with a carbon dioxide cylinder conforming to 3.5.5.1 Installed, shall be unfolded and placed in a horizontal position on the floor, or on a table in the Inspection area. For actuation purposes, a four inch length of lanyard shall be attached to the hole of the inflation assembly actuation lever. The time shall be recorded and the inflation assembly shall be immediately actuated with an abrupt pull of the lanyard. The life raft shall be observed during the inflation for conformance to the requirements of 3.8.1. Forty, plus or minus twenty-five minutes after the raft has been Inflated, the temperature and barometric pressure of the inspection area and the pressure in the carbon dioxide chamber of the raft shall be recorded. All pressure readings shall be taken with the life raft in a horizontal position. The recorded pressure shall then be corrected to a temperature of 700 Fahrenheit (21 °Celsius) and a barometric pressure of 29.92 inches of mercury using the correction factors specified in 4.7.1.1 and 4.7.1.2. The corrected pressure shall conform to the requirements of 3.8.1. Upon completion of this test and examination, the actuation lanyard shall be removed and the chamber shall be completely deflated in preparation for the pressure test. Deflation shall be through the oral inflation valve assembly.

4.8.3 Pressure (carbon dioxide chamber). This test shall be performed on the carbon dioxide chamber only and with the carbon dioxide cylinder installed. The completely deflated life raft shall be placed on the floor, or on a table in the inspection area. All pressure readings shall be taken with the raft in a horizontal position. The chamber shall be inflated with air (see 4.7.4) through the oral Inflation valve assembly to a pressure of 5.0 psig and the air supply securely shut-off. After a minimum of 15 minutes, the pressure in the chamber shall be checked, and readjusted if necessary, to the original pressure of 5.0 psig. At the end of 10 minutes after the readjustment period, the pressure shall be recorded and checked for conformance to the requirements of 3.8.2. Visual examination for conformance to the requirements of 3.8.2 shall be performed upon completion of the pressure check. Upon completion of this test and examination, the chamber shall be completely deflated through the oral Inflation assembly in preparation for the leakage test (4.8.4).

4.8.4 Leakage. Leakage tests (4.8.4.1 and 4.8.4.2) shall be performed at the prevailing temperature and barometric pressure within the ranges specified in 4.7.1. The carbon dioxide cylinder shall be installed for this test. The rafts may be stacked one upon another during the four hour waiting period providing the temperature is recorded at the level comparable to the height at which the raft was stowed; and providing that at the end of the four hour waiting period, the raft to be tested is removed from the stack and placed in a horizontal position on the floor or on a table in the inspection area. All pressure readings shall be taken with the raft in this position. In no instance shall the pressure reading be taken with another raft stacked upon it.

4.8.4.1 Carbon dioxide chamber. The orally Inflated chamber shall be completely deflated for this test and examination. The carbon dioxide chamber shall be inflated through its oral inflation assembly with air (see 4.7.4) to a pressure of 2.0 psig and the air supply securely shut-off. After a minimum of 15 minutes the pressure In the chamber shall be checked and readjusted, if necessary, to the original pressure of 2.0 psig. The air supply shall be disconnected and the time, temperature, and barometric pressure shall be immediately recorded. At the end of not less than 4 hours after the readjustment, the time, temperature, barometric pressure, and pressure in the chamber shall be again recorded. The chamber pressure shall be then corrected for any change in the temperature and barometric pressure (see 4.7.1.1 and

4.7.1.2). The corrected pressure shall conform to the requirements of 3.8.3. While inflated the chamber shall be visually examined for conformance to the requirements of 3.8.3. The chamber shall be completely deflated through its oral inflation assembly in preparation for testing of the orally Inflated chamber (4.8.4.2). During the deflation the oral inflation valve shall be depressed and released a minimum of 3 times and observed for conformance to the requirements of 3.8.3.

4.8.4.2 Orally inflated chamber. The carbon dioxide Inflated chamber shall be completely deflated for this test and examination. Testing and examination of the orally Inflated chamber shall be performed using the same procedures specified in 4.8.4.1. The corrected pressure, visual examination, and oral inflation valve check shall conform to the requirements of 3.8.3.

4.8.5 Weight of the life raft. the weight of the life raft shall be determined on a scale or balance capable of weighing to the nearest 0.01 pound. The life raft shall be weighed without the carbon dioxide cylinder for conformance to the requirement of 3.8.4.

4.8.6 Strength of attachment testing of the manifold stem and oral Inflation assembles. Strength of attachment tests shall be performed on a suitable testing apparatus with a movable jaw speed of twelve plus or minus one-half inches per minute under no load. The direction of pull shall be perpendicular. The attachments listed below shall be subjected to the applicable test load and observed for conformance to the requirements of 3.8.5.

Attachment	Test Load in Pounds
a. Carbon Dioxide Inflation Manifold Stem to Chamber	200
b. Oral Inflation Assembly to Carbon Dioxide Chamber and to Orally Inflated Chamber	40

4.8.7 Thermal seam bonding. Five specimens, 1 ± 1/16 Inch wide and 6 ± 1/16 inch long, shall be cut across and perpendicular to the seam of the, life raft chambers. The specimens shall be cut from different locations on one life raft so as to be representative of the sealing of the entire life raft. The specimen shall be taken from the straight portion of the chamber seam. One free end of the specimen (end not bonded) shall be placed in the upper jaw and the other free end in the lower jaw of a suitable inspection apparatus equipped with an autographic recording device (see FED-STD-191, Method 5100). The seam portion of the specimen shall be in the center between the two jaws. The jaws shall be separated until failure occurs, either breaking of the cloth or separation of the thermal bond. In either case the result obtained shall be not less than that specified in 3.8.6. The highest value obtained shall be taken as the result for the thermal seam bonding for the individual specimen. The rate of jaw separation, under no load, shall be 12 ± 1/2 inches per minute. The front clamp of each jaw shall be one to three Inches. The remaining four specimen s shall be similarly treated and Inserted. The inspection results of the five samples shall not be averaged. Each individual inspection specimen shall conform to the thermal seam bonding requirements specified in 3.8.6.

4.8.8 Extreme temperature.

4.8.8.1 At zero °Fahrenheit (minus eighteen °Celslus). A carbon dioxide cylinder conforming to 3.5.5.1 shall be installed on the life raft, and a four inch length of lanyard attached to the hole of the inflation assembly actuation lever. The raft shall be completely deflated and folded in accordance with drawing 1521AS200. The folded raft shall be retained in the folded condition by two separate lengths of appropriate webbing. The raft shall then be conditioned at 0 ± 2 degrees Fahrenheit (-18 ± 1 degrees Celsius) for not less than 48 hours. The raft shall then be removed to the Inspection area and placed on the floor or on a table. The retaining webbings shall be removed and the carbon dioxide inflation assembly immediately actuated with on abrupt pull of the lanyard. The time of actuation shall be recorded and the life raft shall be observed for conformance to the requirements of 3.8.7.1. After 1 ± 1/4 hours, the raft shall be completely deflated and subjected to the leakage inspection (4.8.4). Upon completion of the leakage Inspection the raft shall be completely deflated in preparation for the tests specified in 4.8.8.2.

4.8.8.2 At one hundred sixty 'Fahrenheit (seventy one 'Celsius). The test procedures set forth in 4.8.8.1 shall be repeated, except that the raft shall be conditioned at 160 ± 2 degrees Fahrenheit (71 ± 1 degrees Celsius), for not less than 48 hours. The raft shall be observed for—conformance to the requirements of 3.8.7.2.

5. PACKAGING

5.1 Preservation.

5.1.1 Level A. Each life raft, prepared as specified in 3.11, shall be preserved in accordance with MIL-P-116, Method IC-4 except that the fiber container shall be as specified herein, in lieu of the fiber can. No contact preservative is required, Each life raft shall be completely wrapped in waterproof kraft paper, conforming to PPP-B-1055, and shall be packaged within a snug fitting fiberboard container conforming to PPP-B-636, Style CSSC, Type CF or SF, Weather Resistant Class, Vartiety SW, Grade W5c or W5s. The body joint and the top and bottom flaps shall be firmly glued together as specified in PPP-B-636. The fiberboard container shall not contain any metal fastenings or stitches. All the seams and joints shall be sealed with water resistant tape conforming to PPP-T-76, not less than 2 inches wide.

5.1.2 Level C. Each life raft, prepared as specified in 3.11, shall be individually preserved to afford the minimum degree of protection necessary to prevent deterioration or damage during shipment under normal environmental conditions and commercial modes of transportation.

5.2 Packing. Packing shall be Level A, B or C, as specified (see 6.2. lj).

5.2.1 Level A. Four (4) life rafts, preserved as specified in 5.1.1, shall be packed as specified in 5.2.2, except that the fiberboard container shall be Heather Resistant Class, Variety SW, Grade V3C or V3s. In addition, each container shall be reinforced with flat steel strapping or tape banding in accordance with the appendix to PPP-B-636.

5.2.2 Level B. Four (4) life rafts, preserved as specified in 5.1.1, shall be packed within a snug fitting fiberboard container conforming to PPP-8-636, Type CF or SF, Domestic Class, Variety SW, Grade 275. Each container shall be constructed and closed in accordance with the appendix to PPP-B-636. The fiberboard container shall not contain any metal fastenings or stitches.

5.2.3 Level C. The preserved life rafts, which require packing for acceptance by the carrier, shall be packed within exterior type shipping containers in a manner that will Insure safe transportation at the lowest rate to the point of delivery. The shipment shall conform to the minimum requirements of the rules and regulations applicable to the mode of transportation selected.

5.3 Marking.

5.3.1 Standard marking. In addition to any special or other identification marking required by the contract (see 6.2.lk), each unit and exterior container shall be marked in accordance with MIL-STD-129. The complete military or contractor's type or part number, and the Commercial and Government Entity Number (CAGE) shall be marked on all unit packs in accordance with the identification marking provision of MIL-STD-129.

5.3.2 Special marking. In addition to the marking requirements of 5.3.1 and regardless of the level or type of preservation specified, each exterior container shall be marked as required by the Department of Transportation CFR 49.

5.4 General.

5.4.1 Exterior containers. Exterior containers (see 5.2.1, 5.2.2, and 5.2.3) shall be of a minimum tare and cube consistent with the protection required and shall contain equal quantities of identical stock numbered Items to the greatest extent practicable.

5.4.2 Packaging inspection. The Inspection of these packaging requirements shall be in accordance with table III and 4.8.1.2.

6. NOTES

6.1 Intended use. This life raft is Intended for use as emergency equipment by aircraft personnel forced down at sea.

6.2 Ordering data.

6.2.1 Acquisition requirements.

a. Title, number, and date of this specification (including any amendments).

b. Government part numbers.

c. National stock number.

d. Applicable Government drawings, including revisions.

e. Quantity desired.

f. Whether first article inspection is waived (see 4.4.2).

g. Name and address of the first article inspection laboratory (see 4.4.2) and the name and address of the Government activity responsible for conducting the first article inspection program (see 4.4.3).

h. Name and address of the quality conformance verification inspection laboratory (see 4.6) and the name and address of the Government activity responsible for conducting the quality conformance verification inspection program (see 4.6).

i. Certificate of compliance to be provided by the contractor for:

(1) Materials and components conforming to applicable specifications, standards, and drawings (see 3.3 and 6.2.2).

(2) The age of materials (see 3.3 and 6.2.2).

j. Selection of applicable levels of preservation (see 5.1) and packing (see 5.2).

k. Whether any special markings are required (see 5.3.1 and 5.3.2).

l. Selection of the samples to be performed by the cognizant quality assurance representative/specialist (see 4.6).

6.2.2 Data requirements. When this specification is used in an acquisition, and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), Incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-Part 27 .410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor In accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs:

Paragraph no.	Data requirements title	Applicable DID no.	Options
(a) 3.3	Certificate of Compliance for the age of materials and components	DI-E-2121	------
(b) 4.4.3	First article inspection and test reports.	DI-T-5329	-------

(Copies of data item descriptions required by contractors In connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL-85824) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Commander, Naval Air Systems Command (Code 51122), Department of the Navy, Washington D.C., 20361-5110; however, authorization for qualification of products shall be the responsibility of the Commander, Naval Air Development Center, (Code 6031), Warminster, PA 18974-5000. Information on, or authorization to submit qualification samples shall be requested in writing by the manufacturer from the Commander, Naval Air Development Center (Code 6031), Warminster, PA 18974-5000.

6.3.1 Qualification inspection report. When requested, the manufacturer should submit an inspection report in accordance with SD-6, Provisions Government Qualification.

6.4 First article. When a first article inspection is required, the items should be a first article sample. The first article should consist of three life rafts and three sets of gaskets (packaged separately). The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first article. Invitation for bids should provide that the Government reserves the right to waive the requirement for samples for first article Inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.5 Patterns. The pattern drawing for the life raft will be furnished by the contracting officer to the contractor for use in working patterns (see 3.5.1).

6.6 Changes from previous issue. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

6.7 Subject term (key word) listing.

Inflatable
Life raft
One man
Carbon dioxide cylinder

Preparing activity:
Navy-AS

(Project 4220-N351)

TABLE I. Qualification examinations and tests.

Inspection	Paragraph Requirement	Paragraph Method
Operation (carbon dioxide)	3.8.1	4.8.2
Pressure	3.8.2	4.8.3
Leakage	3.8.3	4.8.4
Weight of the life raft	3.8.4	4.8.5
Strength of attachments	3.8.5	4.8.6
Thermal seam bonding	3.8.6	4.8.7
Extreme temperature	3.8.7.1 and 3.8.7.2	4.8.8.1 and 4.8.8.2
Visual examination	3.9	4.8.1.1
Dimensional check of the life raft	3.9	4.8.1.1
Dimensional check of the Top and Bottom Gaskets	3.5.5.2.1	4.8.1.1.1

TABLE II. First article examinations and tests.

Inspection	Paragraph Requirement	Paragraph Method
Weight of the life raft	3.8.4	4.8.5
Operation (carbon dioxide)	3.8.1	4.8.2
Pressure	3.8.2	4.8.3
Leakage	3.8.3	4.8.4
Strength of attachments	3.8.5	4.8.6
Thermal seam bonding	3.8.6	4.8.7
Visual examination	3.9	4.8.1.1

TABLE II. First article examinations and tests. - Continued.

Inspection	Paragraph Requirement	Paragraph Method
Dimensional check of the life raft	3.9	4.8.1.1
Dimensional check of the Top and Bottom Gaskets	3.5.5.2.1	4.8.1.1.1

TABLE III. Sample size criteria, tests and examinations of the life rafts and packaging.

Inspection	Requirement Paragraph	Method Paragraph	Sample size	Acceptance criteria
Visual examination	3.9	4.8.1.1	a. Every life raft for critical defects. b. Inspection Level II for minor defects.	a. Reject all units with any critical defect. b. An acceptable quality level of 15.0 defects per 100 units for minor defects.
Dimensional	3.9	4.8.1.1	Inspection Level S-3	An acceptable quality level of 100 defects per 100 units.
Dimensional check of the Top and Bottom Gaskets	3.5.5.2.1	4.8.1.1.1	Every Gasket	Reject all defective Units
Operation (carbon dioxide) 1/, 3/	3.8.1	4.8.2	Every life raft	Reject all defective units.
Pressure 2/, 3/	3.8.2	4.8.3	Every life raft	Reject all defective units.
Leakage 1/, 3/	3.8.3	4.8.4	Every life raft	Reject all defective units.

TABLE III. Sample size criteria, tests and examinations of the life rafts and packaging. - continued.

1/ These Inspections shall be performed in sequence. The operation (carbon dioxide) inspection shall be performed first and then the leakage inspection.

2/ Pressure tests may be performed prior to final assembly of the life raft, or after Final assembly. In the event the pressure tests are performed after final assembly, the test shall be performed in sequence with operation and leakage test (i.e., operations first, pressure second, and leakage last).

3/ The results of the operation, pressure, and leakage inspections shall be identifiable by the assigned serial numbers, which shall be marked on the life raft, as specified in 3.7.1.

4/ The gaskets shall be dimensionally checked prior to installation on the life rafts.

TABLE IV. Classification of defects for the visual examination of the life rafts.

Critical	Minor
1. Any non-specified hole, cut patch or burn.	201. Stitching not as specified. 3/
2. Any cloth damaged, bruised, abraded, containing imperfections, or is otherwise defective. 1/	202. One or more spots or stains. 3/
3. Inlet valve assembly not in accordance with requirements or defective.	203. Any cut edge of uncoated nylon fibrous materials not seared or containing sharp edges.
	204. Any pile or hook tape missing, mislocated, or otherwise defective. 3/

TABLE IV. Classification of defects for the visual examination of the life rafts. - Continued.

Critical	Minor
4. Oral inflation assembly mislocated, bent, distorted, or inoperable. Oral tube clamp not securely installed.	205. Oral inflation assembly or components not as specified or type oral tube not locked in the closed position.
5. Any burns, channels, or voids in any heat sealing operation.	206. Any metal component not properly finished or containing nicks, burrs, dents, sharp edges, or rough surfaces. 3/
6. Any component, component part, or required operation omitted; or any operation improperly performed, not herein classified. 2/	207. Color of any component not as specified.
7. Any components not as specified, or any defect of a component or assembly, not herein classified. 2/	208. Any required markings missing, illegible, incomplete, incorrect, or improperly located.
8. Any gasket not conforming to dimensional requirements.	209. Any inspection record patch illegible, incomplete, incorrect, or improperly oriented or located.
	210. Cement on the cloth surfaces around the scuff panel not visible or in excess of requirements. 3/
	211. Any clot or mass of adhesive.
	212. Scuff panel separating.
	213. Any cord missing or not securely attached as specified.
	214. Excessive wrinkling in any cementing or heat sealing operation.

1/ The defect shall be classified critical if it is in the Inflatable section; otherwise, it is to be classified minor.

2/ The defect shall be classified critical when it seriously affects serviceability or function; otherwise, it is to be classified minor.

3/ The defect shall be classified as minor when it does not seriously affect serviceability or function; otherwise, it is to be classified critical.

TABLE V. List of defects for finished dimensions of the life rafts.

Examine	Defect
Measure the life raft and all the visible components, as applicable.	Any measurement deviating from the dimensions and tolerances as specified in the applicable drawings shall be enumerated as a dimensional defect.

TABLE VI. List of defects for packaging. (See 4.8.1.2)

ITEM	DEFECT
Exterior and interior markings	Missing, incorrect, incomplete, illegible, of improper size, location, sequence, or method of application; markings not the same on the interior and exterior containers.
Packaging and Packing materials	Any non-conforming component; any component missing, damaged, or otherwise defective.
Workmanship	Inadequate application of the components such as incomplete closure of the unit package, container flaps, loose strapping, etc.; bulging or distortion of the containers; unit container contains metal fastenings or stitches.
Exterior and interior weight or content	Number per container is more or less than required; gross or net weight exceeds the requirements; warning tag not visible; any metal component not covered as specified.
Folding	Folding not as specified in drawing 1521AS200; manner of folding damages the life raft or any component; oral inflation tubes folded, bent, distorted, or creased.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-L-85824A(AS)	LIFE RAFT, INFLATABLE, ONE MAN, VEE BOTTOM, LRU-18/U

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
	☐ USER
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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