INCH-POUND

MIL-DTL-81722B(AS)
17 April 2017
SUPERSEDING
MIL-V-81722A(AS)
w/AMENDMENT 2
04 May 2001

DETAIL SPECIFICATION

VALVE, INFLATION, LIFE RAFT, FLU-6/P

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

1. SCOPE

1.1 Scope. This specification covers the requirements for an FLU-6/P life raft inflation valve.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 or 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 or 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

Comments, suggestions, or questions on this document should be addressed to: Commander, Naval Air Warfare Center Aircraft Division Lakehurst, Code 4.1.2.2, Route 547, Mail Stop 120-3, Joint Base MDL, NJ 08733-5100 or emailed to michael.sikora@navy.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

AMSC N/A FSC 4220

FEDERAL SPECIFICATION

BB-C-101	Carbon Dioxide (CO_2), Technical and USP

FEDERAL STANDARD

FED-STD-H28/2	Screw-Thread Standards for Federal Services Section 2 Unified Inch Screw Threads – UN and UNR Thread Forms

COMMERCIAL ITEM DESCRIPTIONS

A-A-208	Ink, Marking, Stencil, Opaque (Porous and Non-porous Surfaces)
A-A-59503	Nitrogen, Technical
A-A-59622	Tags, Shipping and Stock

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-7905	Cylinders, Steel, Compressed Gas, Non-Shatterable, Seamless, 1800 PSI and 2100 PSI
MIL-DTL-19834	Plates, Identification or Instruction, Metal Foil, Adhesive Backed

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-129	Military Marking for Shipment and Storage
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-889	Dissimilar Metals
MS26545	Cylinder, Steel Compressed Gas, Non-shatterable, 1800 and 2100 PSI

(Copies of these documents are available online at http://quicksearch.dla.mil/.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

NAVAL AIR SYSTEMS COMMAND DRAWING

CL202D2	Actuation Modification, Inflation Valve Drawing

(Copies of this document are available online from the Naval Air Technical Data and Engineering Service Center (NATEC) at https://webjedmics.navair.navy.mil/webjedmics/index.jsp.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY FOR QUALITY

ANSI/ASQ Z1.4	Sampling Procedures and Tables for Inspection by Attributes. (DoD Adopted)

(Copies of this document are available online at www.asq.org.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. Unless otherwise specified, the FLU-6/P one man life raft inflation valve furnished under this specification shall be a product that has been inspected and has passed the first article inspection specified in 4.2.

3.2 Materials and components. The materials and components shall conform to the applicable specifications and drawing as listed or required herein. Unless otherwise specified, elastomers and tetrafluoroethylene used in the inflation valve shall have been manufactured not more than 12 months prior to the date of delivery of the inflation valve (see 6.2(d)).

3.2.1 Metals. The metals used in the inflation valve shall be of the corrosion resistant type or shall be suitably protected as specified herein to resist corrosion due to salt spray or atmospheric conditions to which the inflation valve may be subjected, when in storage or during normal service life.

3.2.1.1 Dissimilar metals. Dissimilar metals, as defined in MIL-STD-889, shall not be used in intimate contact with each other, unless suitably protected against electrolytic corrosion by means of protective coatings.

3.2.2 Protective treatment. When materials are used in the construction of the inflation valve that are subject to deterioration when exposed to environmental conditions likely to occur

during service usage, they shall be protected against such deterioration in a manner that will in no way prevent compliance with the performance requirements of this specification. Protective coatings that might crack, chip, or scale during normal service life or under extremes of environmental conditions shall not be used.

3.3 Design.

3.3.1 General design requirements. The inflation valve shall be designed to be compatible for use with all one man life raft assemblies and shall conform to the requirements on figure 1. The inflation valve assembly shall consist of the following major components: a valve body subassembly, a cap, and a lanyard assembly. In addition, the valve assembly shall have a seal washer, coupling nut, spring clip and diffuser, as specified in this specification. The valve body subassembly shall include a movable sleeve (see figure 2) which is positioned by means of a spring assembly. The sleeve shall not be capable of being moved until the spring tension is released. Further, the valve assembly shall have provisions for removal of the lanyard assembly from the valve body without the use of any special tools. The valve assembly shall have provisions for recharging without the use of any special tools; however, if parts removal is required to affect a recharge, suitable securing provisions shall be included to preclude inadvertent valve disassembly. The inflation valve assembly shall be designed to operate freely under all conditions to which it may be subjected and shall be operable from any direction of pull. The valve assembly, when actuated, shall provide an unrestricted passage of carbon dioxide gas from the outlet without leakage. A safety port consisting of a safety plug and replaceable frangible disc shall be provided to release the carbon dioxide gas into the atmosphere in case of excessive cylinder pressure. The valve shall permit charging of the CO_2 cylinder through the outlet. Upon actuation of the valve, the lanyard assembly shall separate completely from the valve body. All parts not specifically detailed in the specification shall be entirely compatible with those components which are specified.

3.4.2 Specific design requirements.

3.4.2.1 Valve body. The valve body shall conform to the requirements on figure 2.

3.4.2.2 Diffuser. The inflation valve shall be furnished with a diffuser conforming to figure 3. The diffuser shall be fully inserted into the coupling nut of the valve with hand tightening.

3.4.2.3 Spring clip. A spring clip conforming to figure 3, shall be installed on each valve to prevent the inadvertent release of the lanyard assembly when the cap is moved or jarred accidentally. The spring clip shall in no way interfere with the function of the valve nor of the lanyard assembly, which shall separate from the valve when it is in the fully open position. The spring clip shall be retained as shown on figure 1.

3.4.2.4 Seal washer. The washer shall be made from soft annealed copper and shall conform to the requirements on figure 3.

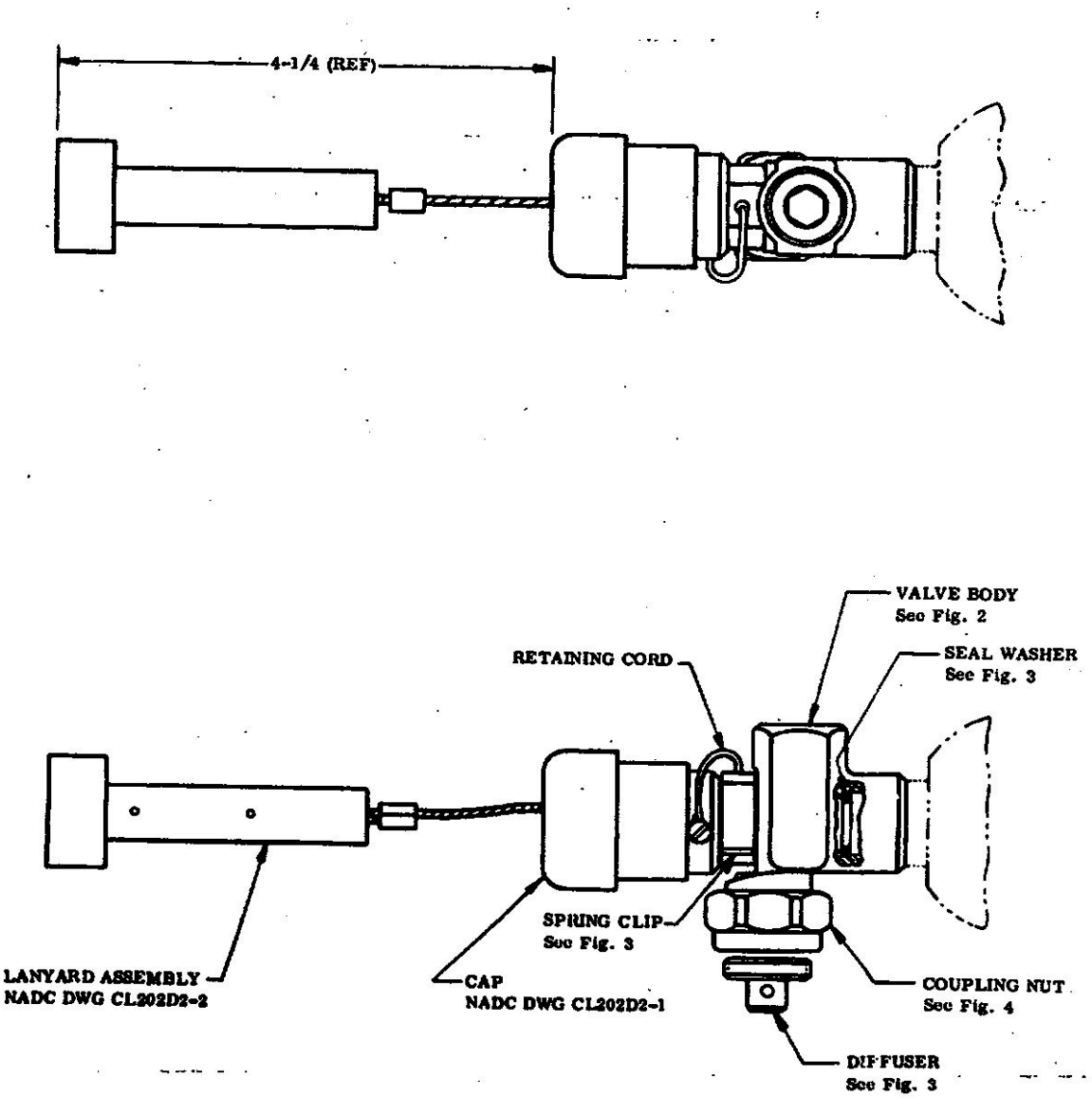
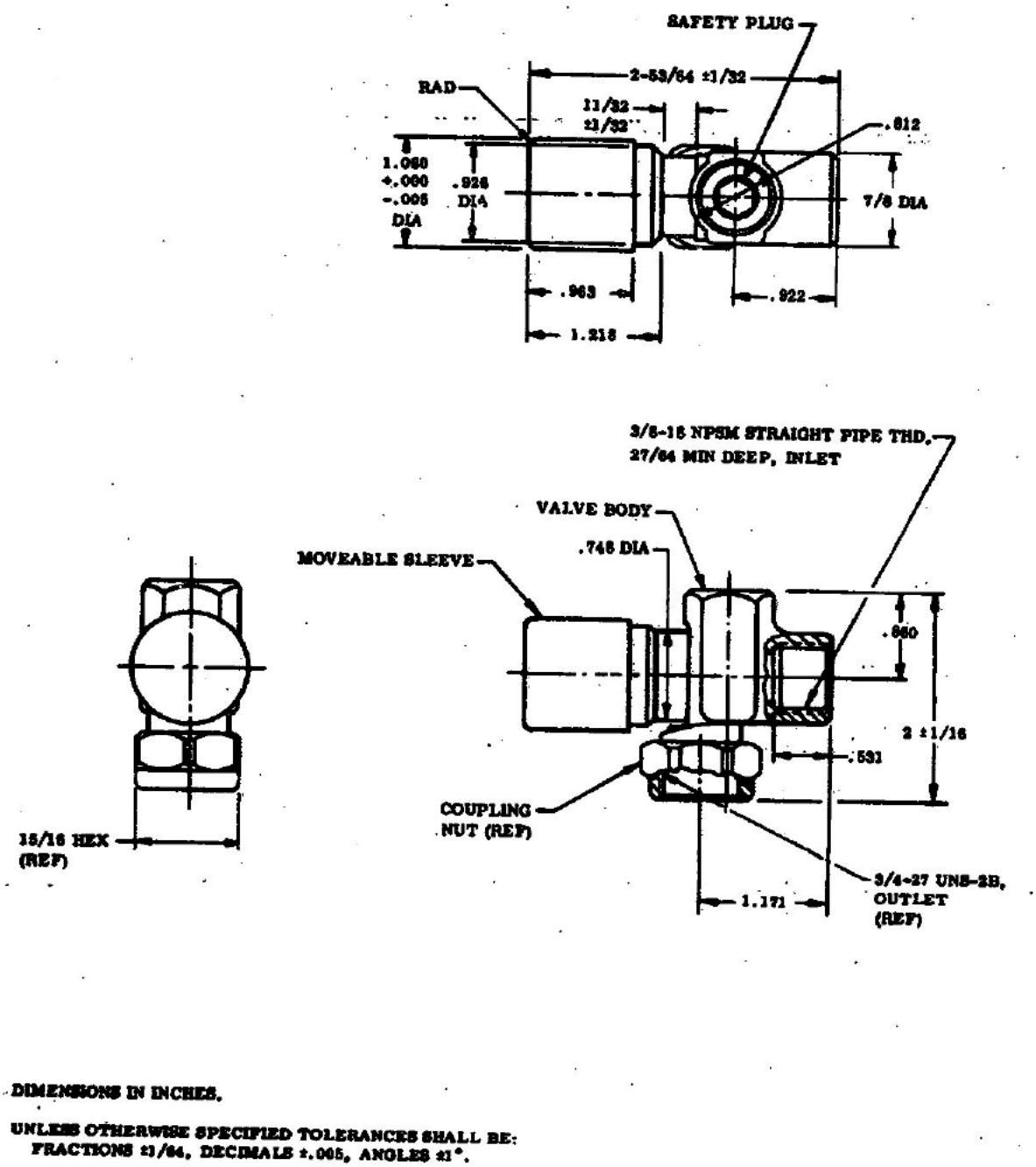


FIGURE 1. Inflation valve assembly.



DIMENSIONS IN INCHES.

UNLESS OTHERWISE SPECIFIED TOLERANCES SHALL BE:
FRACTIONS ±1/64, DECIMALS ±.005, ANGLES ±1°.

FIGURE 2. Valve body subassembly.

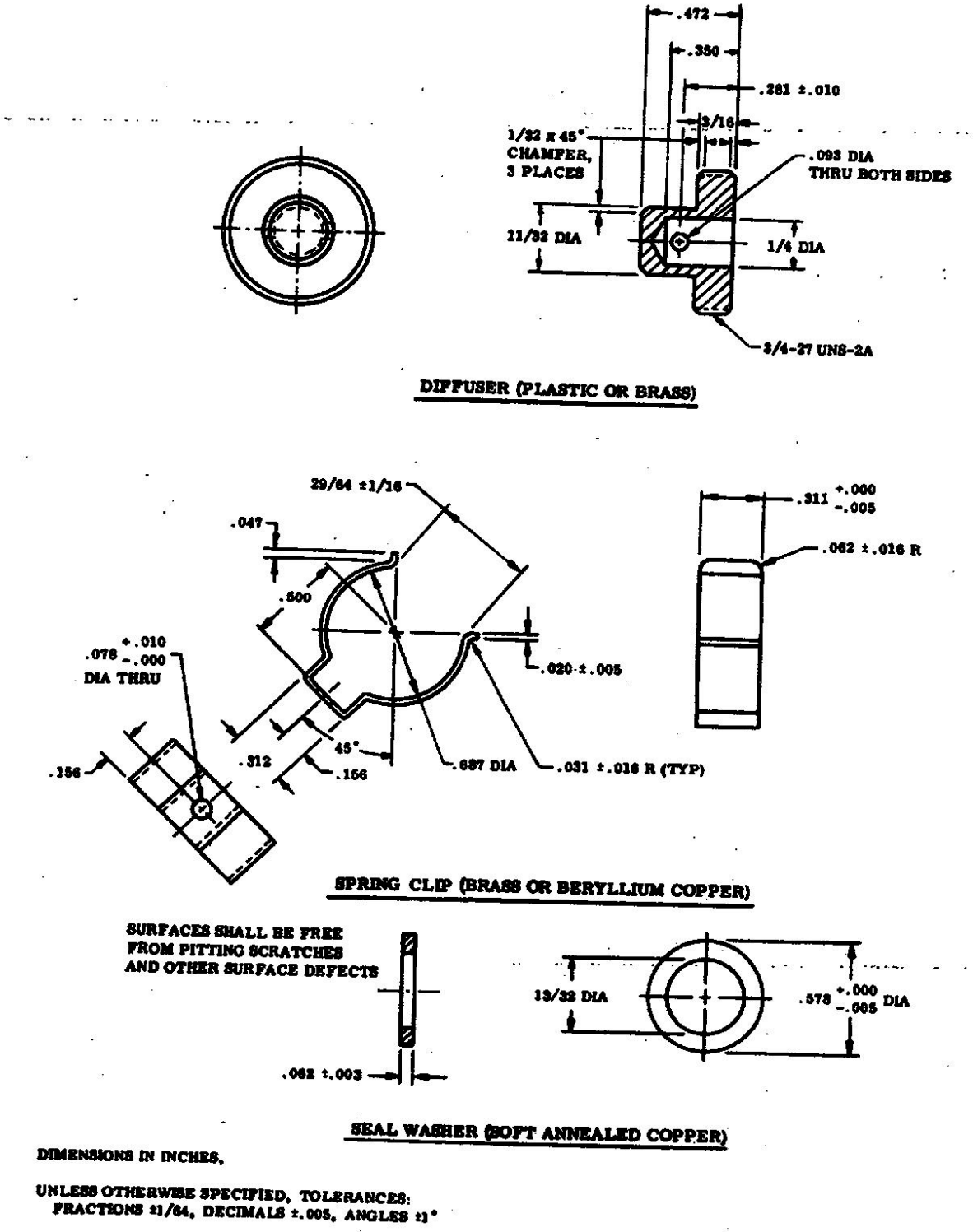


FIGURE 3. Inflation valve details.

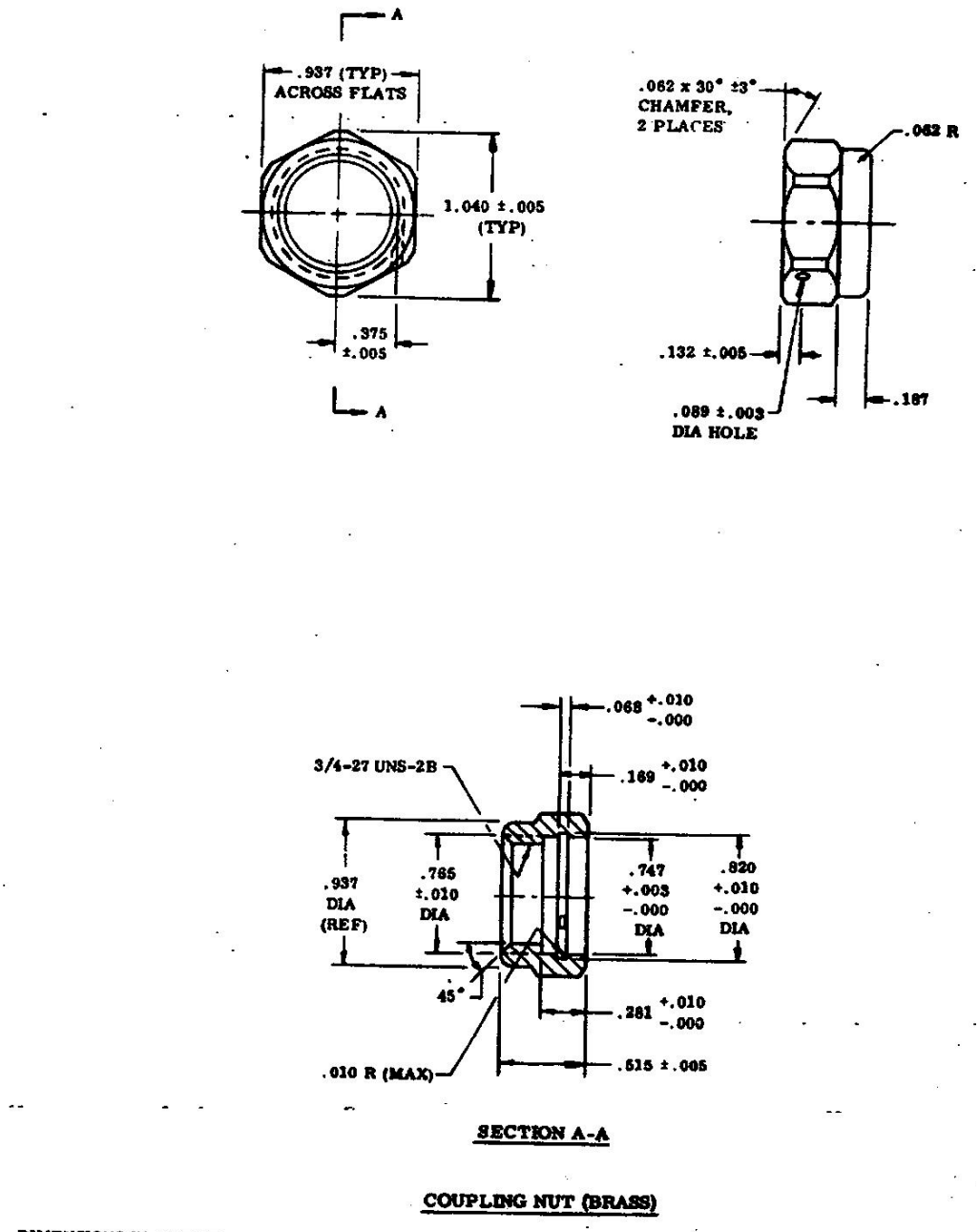


FIGURE 4. Inflation valve details.

3.4.2.5 Coupling nut. The coupling nut shall be made of brass and shall conform to the requirements on figure 4.

3.4.2.6 Cap. A cap shall be installed by cementing the cap to the plastic sleeve of the valve. Polychloroprene adhesive only shall be used. The cap shall conform to the requirements on NAVAIR Drawing CL202D2.

3.4.2.7 Lanyard assembly. The lanyard assembly shall conform to the requirements on NAVAIR Drawing CL202D2.

3.4.2.8 Screw threads. The screw threads shall conform to FED-STD-H28/2 and the designation specified on figure 2 and figure 3, as applicable.

3.5 Performance inspections.

3.5.1 Leakage. The inflation valve, when inspected as specified in 4.5.2 through 4.5.2.3, as applicable, shall conform to table I.

TABLE I. Leakage limits.

Temperature °F	Maximum Leakage Rate Milliliters/Hr
70	None
160	¼
Minus 65	5

3.5.2 Operating force. The inflation valve, when inspected as specified in 4.5.3, shall require an operating force of 15 to 21 pounds to fully open the valve. The lanyard assembly shall separate completely from the valve without damage to the valve or to itself.

3.5.3 Operation. The inflation valve, when inspected as specified in 4.5.4.1 and 4.5.4.2, as applicable, shall discharge the minimum amounts of carbon dioxide specified in table II in a maximum time of 5 seconds. There shall be no leakage from the body of the valve. The diffuser shall be removed during this test.

TABLE II. Amount of carbon dioxide discharged.

Temperature °F	Minimum percent discharged
70	90
Minus 20	50

3.5.4 Endurance. The inflation valve, when inspected as specified in 4.5.5, shall permit the lanyard assembly to separate completely each time the valve is actuated, without damage to the valve or itself. The cable or any of its strands shall not break and the loop shall not separate from the cable. The cable shall not be damaged, become loose, or separate from the lanyard assembly. The sleeve and spring assembly shall not be capable of being moved down until the

spring tension is released. The sleeve and spring assembly shall not become frozen and shall be capable of being moved up or down without difficulty. There shall be no difficulty in charging the carbon dioxide cylinder while attached to the inflation valve. The valve shall then be inspected and conform to the requirements for leakage at 70 ^{0}F, 3.5.1, operating force, 3.5.2, and operation at 70 ^{0}F, 3.5.3, in the order listed.

3.5.5 Coupling nut torque. When inspected as specified in 4.5.6, the coupling nut of the valve shall withstand an initial tightening torque of 80 inch-pounds with less than 5 milliliters/hour leakage. The torque shall then be increased to 25 foot pounds without failure, resultant leakage, or permanent deformation to the coupling nut.

3.5.6 Hydrostatic pressure of the frangible disc. The inflation valve, when inspected as specified in 4.5.7, shall be constructed in such a way that the frangible disc will burst at a pressure between 3150 and 3500 psig, without any damage to the valve.

3.5.7 Vibration. When vibrated as specified in 4.5.8, the carbon dioxide filled cylinder shall not be activated nor shall there be a loss in weight of the carbon dioxide charge. The sleeve and spring assembly shall not have moved down. The spring clip and lanyard assembly shall not have separated from the valve. The sleeve and spring assembly shall not be capable of being moved down until the spring tension is released. The sleeve and spring assembly shall not become frozen and shall be capable of being moved up or down without difficulty. The ball shall not be damaged, become loose or separate from the lanyard assembly. The valve shall then be inspected and conform to the requirements for leakage at 70 ^{0}F, 3.5.1, operating force, 3.5.2, and operation at 70 ^{0}F, 3.5.3, in the order listed.

3.5.8 Cycling. When inspected as specified in 4.5.10, the inflation valve shall function properly. The valve, when actuated, shall provide an unrestricted passage of the carbon dioxide gas through the outlet without leakage from the valve body. The lanyard assembly shall separate completely from the valve, without damage to the valve or itself, each time the carbon dioxide filled cylinder is actuated. The cable or any of its strands shall not break and the loop shall not separate from the lanyard assembly. The ball shall not be damaged, become loose or separate from the lanyard assembly. The sleeve and spring assembly shall not be capable of being moved down until the spring tension is released. The sleeve and spring assembly shall not become frozen and shall be capable of being moved up or down without difficulty. After completion of cycling, the valve shall then be inspected and conform to the requirements for leakage at 70 ^{o}F, 3.5.1, operating force, 3.5.2, and operation at 70 ^{o}F, 3.5.3, in the order listed.

3.5.9 Gravity drop operation. When inspected as specified in 4.5.9, the inflation valve shall function properly. The valve when actuated shall provide an unrestricted passage of the carbon dioxide gas through the outlet without leakage from the valve body. There shall be no difficulty in charging the carbon dioxide cylinder while attached to the inflation valve. The lanyard assembly shall separate completely from the valve, without damage to the valve or itself, each time carbon dioxide filled cylinder is actuated. The cable or any of its strands shall not break and the loop shall not separate from the cable. The ball shall not be damaged, become loose or separate from the lanyard assembly. The sleeve and spring assembly shall not be capable of being moved down until the spring tension is released. The sleeve and spring assembly shall not

be frozen and shall be capable of being moved up or down without difficulty. The valve shall then be inspected and conform to the requirements for leakage at 70 ºF, 3.5.1, operating force, 3.5.2, and operation at 70 ºF, 3.5.3, in the order listed.

3.5.10 Salt spray. When inspected as specified in 4.5.11, the inflation valve assembly shall show no evidence of permanent corrosion or damage. The coupling nut shall swivel freely after removal of the diffuser, and the movable sleeve shall be capable of being removed when the spring tension is released. The valve shall then be inspected for conformance to the requirements of leakage at 70 ºF, 3.5.1, operating force, 3.5.2, and operation, 3.5.3 at 70 ºF, in the order listed.

3.5.11 Strength of the lanyard assembly cable and attachments. When inspected as specified in 4.5.12, the loop, sleeve, and ball of the lanyard assembly shall withstand a force of 100 pounds without the cable or any of its strands breaking, loosening of the ball, or the loop or ball separating from the cable.

3.5.12 Weight. When determined as specified in 4.5.13, the maximum weight of the inflation valve and all components shall not exceed 0.35 pound.

3.6 Markings. Each inflation valve shall be marked with legible, durable, and sharply defined letters and numerals. The markings shall be molded characters conforming to MIL-STD-130, or inscribed on metal foil identification plates conforming to MIL-DTL-19834, Type I, and shall be as follows:

INFLATION VALVE, FLU-6/P
MIL-DTL-81722B(AS)
CONTRACT NO.
MANUFACTURER'S NAME OR TRADEMARK AND PART NUMBER
DATE OF MANUFACTURE (Month and Year)

The contract number and date of manufacture may be accomplished with the marking ink conforming to A-A-208, black or blue in color; and when dry, shall be coated with a compatible, clear, waterproof lacquer.

3.6.1 Warning tag. Each inflation valve shall contain a warning tag, affixed behind the coupling nut, conforming to A-A-59622, color red, with the following information:

CAUTION

Install diffuser on inflation valve coupling when the inflation assembly (valve and cylinder) is not connected to the raft manifold.

3.7 Workmanship. The inflation valve shall be uniform in quality and free from any mechanical or other irregularities, or defects which would adversely affect performance, reliability or durability. Because of the emergency use of this item, the importance of providing a product of uniform excellent quality cannot be overemphasized. The FLU-6/P one man life raft inflation valves shall conform to the quality and grade of product established by this

specification. The occurrence of defects shall not exceed the acceptance criteria established herein.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection.
b. Conformance inspection.

4.2 First article. First article inspection consists of examinations and tests performed on samples that are representative of the production item after award of a contract to determine that the production item meets the requirements of this specification. First article inspection of the inflation valve shall consist of the examinations and tests specified in table III for each sample valve. The examinations and tests shall be performed in the sequence listed.

4.2.1 First article samples. Unless otherwise specified, as soon as practicable after award of the contract or order, the manufacturer shall submit four inflation valves and four diffusers. 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 inflation valves from contract to contract, submission of further first article inspection samples on the new contract may be waived at the discretion of the procuring activity (see 6.2(c)). Approval of first article inspection samples or the waiving of the first article inspection does not preclude the requirements for performing the conformance inspection. The first article inspection samples shall be furnished to the government as directed by the contracting officer (see 6.2(c)).

4.2.2 First article approval. Upon completion of the first article inspection, all the applicable inspection reports and, when applicable, recommendations and comments pertinent for use in monitoring production will be forwarded to the cognizant Government activity. One of the approved first article inspection sample inflation valves will be returned to the manufacturer for use in monitoring production. The other three valves will be destroyed in the first article inspection and shall not be considered as a part of the quantity to be delivered under the contract.

TABLE III. First article inspections.

Sequence of Inspection	Paragraph		Sample Number			
	Requirement	Method	1	2	3	4
Visual examination	Section 3 and applicable drawings	4.5.1.1	X	X	X	X
Dimensional check	1/	4.5.1.1	X	X	X	X
Weight	3.5.12	4.5.13	X	X	X	
Leakage at 70 ^{0}F	3.5.1	4.5.2.1.2	X	X	X	
Operating force	3.5.2	4.5.3	X	X	X	
Operation at 70 ^{0}F	3.5.3	4.5.4.1	X	X	X	
Operation at minus 20 ^{0}F	3.5.3	4.5.4.2	X			
Leakage at 160 ^{0}F	3.5.1	4.5.2.2	X			
Coupling nut torque	3.5.5	4.5.6		X		
Hydrostatic pressure of the frangible disk	3.5.6	4.5.7		X		
Strength of the attachments to the lanyard assembly	3.5.11	4.5.12		X		
Gravity drop operation	3.5.9	4.5.9			X	
Cycling	3.5.8	4.5.10		X		

1/ The valve shall be checked dimensionally for conformance to figures 1 through 4.

4.3 Conformance inspection. Conformance inspection consists of examinations and tests performed on individual products or lots to determine conformance of the products or lots to the requirements set forth in this specification (see 4.3.1.2). The sampling and inspection levels shall conform to ANSI/ASQ Z1.4. The conformance inspection shall consist of the following examinations and tests:

Visual examination of the inflation valves
Dimensional check of the inflation valves

Leakage at 70 ^{0}F, at 160 ^{0}F, and at minus 65 ^{0}F
Operating force
Operation at 70 ^{0}F and at minus 20 ^{0}F
Coupling nut torque
Strength of attachments to the lanyard assembly
Gravity drop operation
Weight

4.3.1 Sampling.

4.3.1.1 Inspection lot.

4.3.1.1.1 Valves. An inspection lot size shall be expressed in units of one valve made essentially under the same conditions and from the same materials and components. The sample unit shall be one valve.

4.3.1.1.2 Preparation for delivery. An inspection lot size shall be expressed in units of one fully prepared shipping container, including valves, fully prepared for delivery from essentially the same materials and components. The sample unit shall be one shipping container, including valves, fully prepared for delivery with the exception that it need not be sealed.

4.3.1.2 Sampling for examinations and tests of the valves and preparation for delivery. The sample size, acceptance criteria, examinations, and tests required for the valves and preparation for delivery shall be as specified in table IV.

TABLE IV. Sample size, examinations, and tests of the valves.

Inspection	Paragraph		Sample size
	Requirement	Method	
Leakage: 70 ^{o}F			
Single closed position	3.5.1	4.5.2.1.1	Every valve
Both closed positions	3.5.1	4.5.2.1.2	Inspection level S-1

TABLE IV. Sample size, examinations, and tests of the valves - Continued.

Inspection	Paragraph		Sample Size
	Requirement	Method	
Operating force	3.5.2	4.5.3	Every valve
Operation at 70 ºF	3.5.3	4.5.4.1	Inspection level S-1
Strength of attachments to lanyard assembly	3.5.11	4.5.12	Inspection level S-1
Operation at -20 ºF	3.5.3	4.5.4.2	Inspection level S-1
Leakage at 160 ºF 1/	3.5.1	4.5.2.2	Inspection level S-1
Leakage at -65 ºF 1/	3.5.1	4.5.2.3	Inspection level S-1
Coupling nut torque	3.5.5	4.5.6	Inspection level S-1
Weight	3.5.12	4.5.13	Inspection level S-1
Gravity drop operation	3.5.9	4.5.9	Inspection level S-1
Dimensional check	Section 3 and applicable drawings	4.5.1.1	Inspection level S-1

TABLE IV. Sample size, examinations, and tests of the valves - Continued.

Inspection	Paragraph		Sample size
	Requirement	Method	
Visual examination	Section 3 and applicable drawings	4.5.1.1	Every valve for major defects and Inspection level S-1 for minor defects

1/ The leakage at 160 ºF and leakage at minus 65 ºF, and operation at 70 ºF inspections shall be conducted on the same valves selected as samples for the operation at minus 20 ºF inspection (see 1/).

4.4 Inspection conditions.

4.4.1 Atmospheric conditions. Unless otherwise specified, all the inspections required by this specification shall be conducted at an atmospheric pressure of 28 to 32 inches of mercury, at a temperature of 77 ±18 ºF (25 ±10 ºC). When the inspections are conducted at an atmospheric pressure or temperature different from the above values, proper corrections shall be made for the change in instrument readings.

4.4.2 Carbon dioxide filled cylinder. When use of a carbon dioxide filled cylinder is specified in an inspection, the empty carbon dioxide cylinder shall conform to MIL-DTL-7905 and either MS26545B2C0020, MS26545B4C0020, MS26545B2C0021 or MS26545B4C0021 and shall be charged with 0.50 ±0.01 pound of carbon dioxide conforming to BB-C-101, Grade B, Type I. The cylinder shall be installed in the valve with a torque of 23 to 25 foot pounds. Prior to installation of the valve on the cylinder, inspect the cylinder for cleanliness (e.g., loose dirt, rust, etc.).

4.4.3 Nitrogen. When use of gaseous nitrogen is specified in an inspection, the nitrogen gas shall conform to A-A-59503, Type I, Class 1, Grade B.

4.4.4 Seal washer. The seal washer conforming to figure 3 shall be replaced each time a carbon dioxide cylinder is attached to the valve during the inspection of the valve. Inflation valves shall contain new, unused (compressed), seal washers.

4.4.5 Drying. Unless otherwise specified, the inflation valve, upon completion of the inspections, which require the inflation valve to be immersed in a liquid, shall be dried for 60 minutes at approximately 86 ºF (30 ºC), in a vacuum oven.

4.5 Inspection methods.

4.5.1 Visual examination.

4.5.1.1 Valves. Every valve shall be examined visually for major defects to determine conformance to this specification. Each valve, selected as a sample unit from the lot, shall be examined visually for minor defects and checked dimensionally to determine conformance to this specification. The classification and list of defects, tables V and VI, shall be used to classify and enumerate the defects found.

TABLE V. Classification of defects for the visual examination of the valves.

Major		Minor	
101.	Any surface rough, misaligned, or contains any nick, sharp edge, crack, burr, pit, dent, sliver or scale.	201.	Any markings missing, incorrect, illegible, incomplete, not of a permanent nature, or improperly located.
102.	Any finish missing or any component improperly finished.	202.	When applicable, contract number and date of manufacture not coated (see 3.6).
103.	Any component missing, malformed, corroded, fractured, chipped, bent, distorted, or damaged.	203.	Surface unclean or contains embedded foreign matter.
104.	Any component loose, detached, not attached as specified, or otherwise not securely retained.	204.	Any component not as specified or any defect of a component or defect of an assembly not herein classified which does not seriously affect the serviceability or appearance.
105.	Any threads missing, stripped, torn or broken.	205.	Any component, component part or required operation omitted or any operation not herein classified improperly performed which does not affect the serviceability or appearance.
106.	Any functional part that works with difficulty.		
107.	Any component not as specified or any defect of a component or defect of assembly not herein classified.		
108.	Any component, component part, or required operation omitted or any operation not herein classified improperly performed thereby seriously affecting the serviceability or appearance.		

TABLE VI. List of defects for the finished dimensions of the valves.

Examine	Defect
Measure the valve outline, seal washer, diffuser 1/, lanyard assembly, spring clip and cap.`	Any measurement deviating from figures 1 through 4 as applicable, with applicable tolerance shall be enumerated as a dimensional defect.

1/ The diffuser shall be dimensionally checked for conformance to figure 3, as applicable.

4.5.2 Leakage.

4.5.2.1 Leakage at 70 ºF.

4.5.2.1.1 Single closed position. An empty carbon dioxide cylinder shall be installed in the valve and then charged with carbon dioxide (see 4.4.2 and 4.4.4). The valve shall not contain the spring clip or lanyard assembly. The charged cylinder and valve shall be submerged in water, in a vertical position, and stabilized at a temperature of 70 ±5 ºF (21 ±2.8 ºC) for not less than 30 minutes. As an alternate method, nitrogen gas pressure may be applied to the valve inlet, with the valve in the closed position, in place of the charged carbon dioxide cylinder. The pressure shall be stabilized at 845 ±10 psig. Any leakage during this time shall be collected in the apparatus of the type shown on figure 5. The calibrated collection device shall be inverted (the sealed end down) and shall be completely filled with water, at 70 ±5 ºF. A glass plate shall be placed over the wide-mouthed part. The glass plate and the collection device shall be firmly held together and then inverted without the loss of any water. The collection device shall then be submerged in water and the glass plate shall be removed by sliding away without any loss of water in the collection device. The collection device shall be held stationary. The valve shall be placed in relation to the collection device so that leakage from any point of the valve will be collected by the displacement of the water in the collection device. A collection device other than that shown on figure 5 may be used.

4.5.2.1.2 Leakage at both closed positions. The leakage inspection procedure specified in 4.5.2.1.1 shall be repeated, except that the inflation valve shall be tested twice, cocking on first one and then the other of the two opposite flats on the cam head.

4.5.2.2 Leakage at 160 ºF. The leakage inspection procedure specified in 4.5.2.1.1 shall be repeated with the following modifications:

a. The temperature of the water shall be 160 ±5 ºF (71 ±2.8 ºC).

b. For the alternate method, the applied nitrogen gas pressure shall be 2650 ±25 psig.

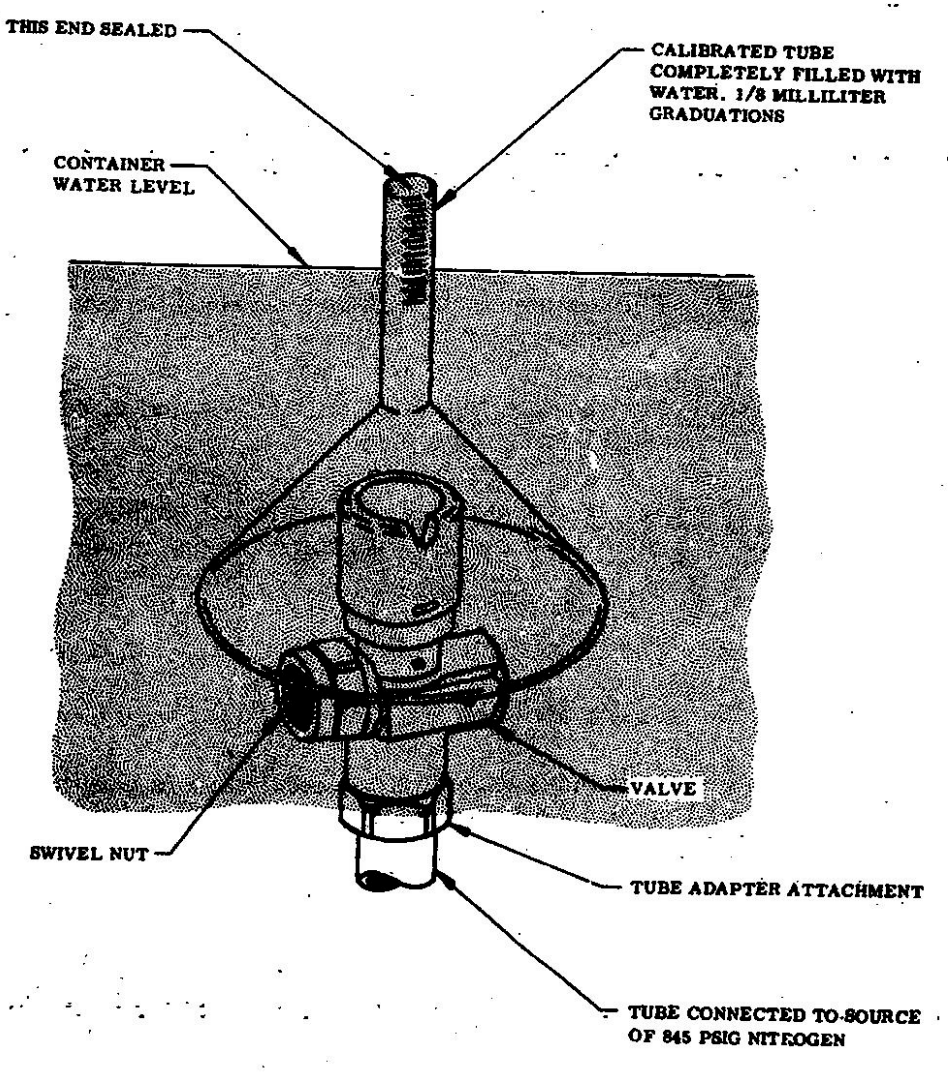


FIGURE 5. Apparatus for determining leakage at 70 ºF.

4.5.2.3 Leakage at minus 65 ºF. The leakage inspection procedure specified in 4.7.2.1.1 shall be repeated with the following modifications:

a. The immersion medium shall be 100 percent isopropyl alcohol.

b. This inspection shall be conducted with nitrogen (see 4.4.3).

c. This inspection shall be conducted in an atmosphere of minus 65 ±5 ºF (-54 ±2.8 ºC).

d. Nitrogen of 1000 psig shall be applied to the valve and the source of the pressure shall be completely shut off. The nitrogen at the valve shall be allowed to reach the ambient conditions, and when the pressure has dropped to its minimum value, the pressure shall be further reduced manually to 100 psig. The pressure at the valve shall be maintained for a minimum of 30 minutes after temperature stabilization.

4.5.3 Operating force. The valve to be inspected shall be in the closed position and shall contain the spring clip, lanyard assembly, and diffuser. The force required to actuate the valve when pulling the cable parallel to the longitudinal axis of the valve shall meet the requirements of 3.5.2, using a device accurate to ±0.1 pound force.

4.5.4 Operation.

4.5.4.1 Operation at 70 ºF. The valve to be inspected shall be in the closed position and shall not contain the spring clip nor the diffuser, when applicable. A cocking tool may be substituted for the lanyard assembly. The inlet valve and an empty carbon dioxide cylinder shall be installed in the inflation valve, and the cylinder shall be charged with carbon dioxide (see 4.4.2 and 4.4.4). The assembled inflation equipment shall be stabilized at 70 ±5 ºF (21 ±3.8 ºC). The assembled inflation equipment shall be weighed on a scale or balance to the nearest 0.01 of a pound. The carbon dioxide filled cylinder shall be securely restrained in a horizontal position and activated. Immediately at the end of 5 seconds, the time being recorded from the instant the carbon dioxide filled cylinder is activated, the valve shall be returned to the closed position, wiped dry, and the assembly reweighed to determine conformance to 3.5.3. The passage of the carbon dioxide gas into the atmosphere shall also be observed (see 3.5.3).

4.5.4.2 Operation at minus 20 ºF. The operation inspection at 70 ºF procedure specified in 4.5.4.1 shall be repeated with the following modifications:

a. The assembled inflation equipment shall be exposed and inspected at minus 20 ±2 ºF (-29 ±1 ºC).

b. The carbon dioxide filled cylinder shall be securely restrained in a vertical position with the valve end down.

4.5.5 Endurance. The valve shall be actuated for 150 times with the lanyard assembly. A cylinder fitted with the CO_2 valve shall then be charged and discharged at room temperature through 10 complete cycles. The cylinder shall be charged with 0.5 pound CO_2 through the

valve outlet, using standard recharging equipment. No difficulty shall be encountered in recharging through the valve outlet. During discharge, the inflation assembly shall be securely restrained and the diffuser installed. The valve shall show no evidence of malfunctioning nor excessive wear during the test. The valve shall meet the requirements for 3.5.4, except that the valve shall not be inspected for conformance to 3.5.1, 3.5.2, and 3.5.3 after each actuation or cycle. After completion of 10 cycles, the inflation valve shall be subjected to the following inspections, in the order listed:

Leakage at 70 ºF (4.5.2.1)
Operating force (4.5.3)
Operation at 70 ºF (4.5.4.1)

4.5.6 Coupling nut torque. The inflation valve to be inspected shall be in the open position. The valve shall not contain the lanyard assembly, spring clip, and the diffuser. A plug with ¾-27 UNS-2A thread with a 0.015x45º chamfer shall be attached to the coupling nut of the inflation valve with a torque of 80 inch pounds. The inflation valve shall then be submerged in water, at 70 ±5 ºF (21 ±2.8 ºC) and covered with a suitable collection device, such as the one shown on figure 5, and nitrogen gas pressure of 15 psig shall be applied to the inlet of the valve. While the pressure is applied, the inflation valve shall be observed for leakage (see 3.5.5). The valve shall then be removed from the water, and the torque on the plug attached to the coupling nut shall be increased to 25 foot pounds. The inflation valve shall once again be submerged in water, at 70 ±5 ºF (21 ±2.8 ºC), and nitrogen gas pressure of 15 psig shall be applied to the inlet of the valve for not less than 60 seconds. While the pressure is applied, the inflation valve shall be observed for leakage (see 3.5.5). Upon completion of the aforementioned, the valve shall be removed from the water, and without making any adjustments, examined for conformance to 3.5.5.

4.5.7 Hydrostatic pressure of the frangible disc. The valve, in the closed position, shall be immersed in water, at a temperature of 160 ±5 ºF (71 ±2.8 ºC) for not less than 15 minutes. At the end of 15 minutes, with the valve at 160 ±5 ºF, hydraulic pressure shall be applied at the valve inlet at a rate of approximately 100 psi per second until the disc ruptures. The valve shall conform to the requirements of 3.5.6.

4.5.8 Vibration. The valve to be inspected shall be in the closed position and shall contain the spring clip and the lanyard assembly. An empty carbon dioxide cylinder and diffuser shall be installed in the inflation valve and the cylinder shall be charged with carbon dioxide, see 4.4.2 and 4.4.4. The assembled inflation equipment shall be weighed on a scale or balance to the nearest 0.01 of a pound and then vibrated for 8 hours along each of the three mutually perpendicular axes of the valve (24 hours total vibration), at an amplitude of 0.060 inch and at a frequency of 10 to 55 cycles per second in one minute cycles. The inflation valve shall be securely restrained during vibration. This inspection may be conducted with or without any rest period between each of the 8 hour vibrations of the different planes. No adjustments shall be made to the assembled inflation equipment during this inspection. Upon completion of the vibration and without making any adjustment, the inflation equipment shall be reweighed and examined for conformity to 3.5.7. Upon completion of the reweighing and examination, the inflation valve shall be subjected to the following inspections, in the order listed:

Leakage at 70 ºF (4.5.2.1)
Operating force (4.5.3)
Operation at 70 ºF (4.5.4.1)

4.5.9 Gravity drop inspection. The inflation valve assembly (see 3.4.1 and figure 1) with a charge carbon dioxide cylinder (see 4.4.2 and 4.4.4) and diffuser installed shall be securely restrained in a sanitary jig or vise. The pull toggle of the lanyard assembly shall be positioned so that the loop end of the cable is exposed. One end of a 6-foot line shall be securely attached to the loop end of the cable, and a 50 ±1/2 pound weight shall be securely attached to the other end of the line. The weight shall then be free-fall dropped through a distance of 6 feet so that the full force of the accelerated mass is applied to the line and cable at the end of the drop. The inflation valve assembly shall be inspected for conformance to the requirements of 3.5.9 (excluding conformance to leakage at 70 ºF, operating force and operation at 70 ºF). The inflation valve assembly shall be tested in each of the following positions (sequence mandatory): vertical with the lanyard assembly down, horizontal, and vertical with the lanyard assembly uppermost. Upon completion of the final position test, the inflation valve assembly shall be inspected for conformance to all the requirements of 3.5.9.

4.5.10 Cycling. The valve to be inspected shall be in the closed position and shall contain the spring clip and the lanyard assembly. An empty carbon dioxide cylinder shall be installed in the inflation valve and the cylinder shall be charged with carbon dioxide (see 4.4.2 and 4.4.4). The cylinder, while attached to the inflation valve, shall be charged and discharged with the lanyard assembly for 50 cycles. A cycle shall consist on one charge and one discharge. A cocking tool or any other suitable means may be used to cock the valve. The inflation assembly shall be securely restrained during cycling. During and after each discharge, the inflation valve shall be examined for conformance to 3.5.8, except that the valve shall not be inspected for conformance to 3.5.1, 3.5.2, and 3.5.3 after each cycle. The inflation valve shall be subjected to the following inspections only after the 50th discharge, in the order listed:

Leakage at 70 ºF (4.5.2.1)
Operating force (4.5.3)
Operation at 70 ºF (4.5.4.1)

4.5.11 Salt fog. The inflation valve to be inspected shall be in the closed position and shall contain the spring clip and lanyard assembly. An empty carbon dioxide cylinder (see 4.4.2 and 4.4.4) and diffuser shall be installed on the inflation valve, and the holes of the diffuser shall be sealed or plugged to prevent the entry of the salt fog. The assembled inflation equipment shall be exposed to salt fog for 100 hours in accordance with MIL-STD-810, Method 509.6. The assembled inflation equipment shall be exposed in a horizontal position, simulating the position as when attached to the life raft. The assembled inflation equipment shall be exposed in such a manner that the salt atmosphere circulates completely around the inflation equipment. At the expiration of the salt fog exposure, the inflation equipment shall be removed and the salt residue washed off as specified in MIL-STD-810, Method 509.6, without making any adjustments. Hot soapy water is an acceptable alternate method of washing off the salt fog. The outer surface of the inflation equipment shall be wiped dry and then hung up, in a manner that permits the atmospheric air to circulate completely around the inflation equipment for 48 ±½ hours. The

inflation valve shall then be examined for conformity to 3.5.10. Upon completion of the examination, the valve shall be subjected to the following inspections in the order listed:

Leakage at 70 ºF (4.5.2.1)
Operating force (4.5.3)
Operation at ºF (4.5.4.1)

4.5.12 Strength of the lanyard assembly cable and attachments. The ball shall be mounted in a suitable shaped jig having a hole of the proper size to clear the pull cable, but capable of holding the ball. A metal rod of proper size and strength shall be inserted through the loop of the pull cable. The jig shall be attached to a fixture of the type shown on figure 6, of sufficient strength for this inspection, and a 100-pound weight shall be attached to the bottom of the test fixture. The weight shall be gradually applied to the lanyard assembly and shall hang freely for not less than 60 seconds. At the end of 60 seconds, the weight shall be removed from the lanyard assembly. The lanyard assembly shall then be examined for conformance to 3.5.11. Text fixtures other than that shown on figure 6 may be used. If a tensile testing machine is used, the jaws shall separate not more than 12 inches per minute (under no load conditions).

4.5.13 Weight. The weight of the inflation valve assembly (i.e., valve, spring clip, diffuser, cap, lanyard assembly, and seal washer) shall be determined to the nearest 0.01 pound. The weight of the assembly shall conform to the requirements of 3.5.12.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

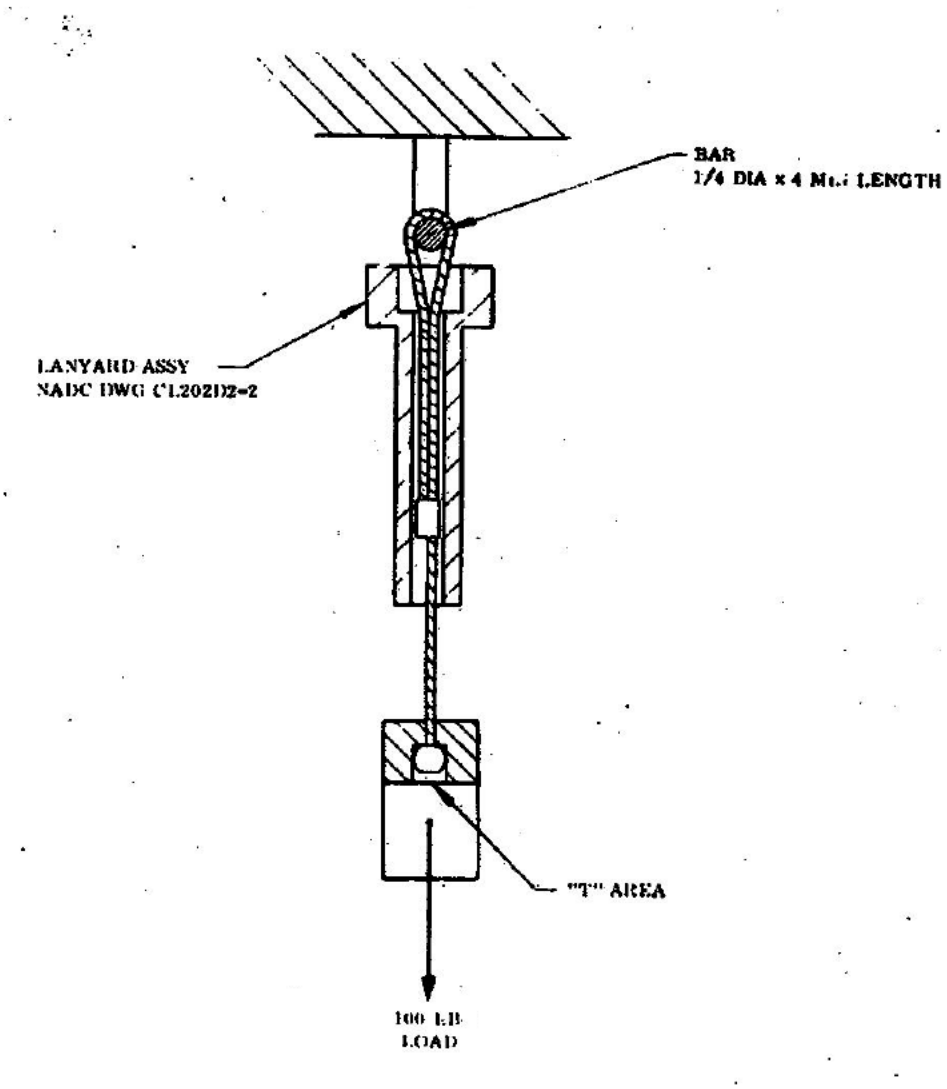


FIGURE 6. Lanyard pull test.

6. NOTES

(This section contains information of a general or explanatory nature that may be may be helpful, but is not mandatory.)

6.1 Intended use. The inflation valves covered by this specification are intended for use as a component of the mechanical inflation system for inflating one man inflatable life rafts.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Quantity desired.
c. When first article inspection is required (see 3.1).
d. Certificate of age compliance for sensitive elastomers (see 3.2).
e. Name and address of the first article inspection laboratory (see 4.2.1).

6.3 Subject term (key word) listing.

Isopropyl alcohol

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

CONCLUDING MATERIAL

Custodian:
Navy – AS

Preparing activity:
Navy - AS

(Project 4220-2017-001)

NOTE: The activity listed above was interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.