

INCH-POUND

MIL-DTL-32088B (OS)

20 June 2011

SUPERSEDING

MIL-DTL-32088A (OS)

19 July 2006

DETAIL SPECIFICATION

INFLATION DEVICE, AUTOMATIC, FLU-12/P

This specification is approved for use by the Naval Sea 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 document gives the requirements for the manufacture, assembly, and packaging of the inflation device, automatic, FLU-12/P and the methods of inspection and tests upon which product acceptance will be based.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 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, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks 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.

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-23659 Initiators, Electric, General Design Specification For

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1168 Ammunition Lot Numbering and Ammunition Data Card

Comments, suggestions, or questions on this document should be addressed to Commander, Indian Head Division, Naval Surface Warfare Center, Technical Information Branch (E143D), 101 Strauss Avenue, Indian Head, MD 20640 5035, or emailed to amanda.penn@navy.mil. Since contact information can change, you may want to verify the currency of this information using the ASSIST Online database at <https://assist.daps.dla.mil>.

AMSC N/A

FSC 1377

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DOD-STD-2101 Classification Of Characteristics

(Copies of these documents are available online at <https://assist.daps.dla.mil/> or from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

DRAWINGS

Naval Air Systems Command

30003-849AS222 Inflation Device, Automatic, FLU 12/P

(Application for copies of these specifications and drawings should be addressed to the Commander, Indian Head Division, Naval Surface Warfare Center (E143), 101 Strauss Avenue, Indian Head, MD 20640-5035.)

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 TESTING AND MATERIALS (ASTM)

ASTM B 117 Standard Practice for Operating a Salt Spray Apparatus

ASTM E 1742/E 1742M Standard Practice for Radiographic Examination

(Copies of these documents are available online at <http://www.astm.org> or from the American Society for Testing and Materials Customer Service, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes

(Copies of this document are available online at <http://e-standards.asq.org/> or from the American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

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.

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3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.3.2.

3.2 General. The FLU-12/P Inflation Device shall be manufactured in accordance with Drawing 30003-849AS222 and all documents and drawings listed thereon. Lot numbers shall be in accordance with MIL-STD-1168.

3.3 Product Baseline. The manufacturer shall maintain a product baseline list. The list shall be complete, specifying each item used in the FLU-12/P. The list shall contain for each item: The Description, Part Number, or Identifying Number, Revision letter and material and/or applicable specification. This list and subsequent revisions shall be submitted for technical review and shall be approved in writing by the Naval Surface Warfare Center Indian Head MD 20640-5035. Only FLU-12/P assemblies conforming to this specification and approved product baseline list will be accepted for delivery.

3.4 Primary components. For the purposes of this specification, the Explosive Component is defined as a primary component (see 4.3.3).

3.4.1 Explosive Component. Primers shall have been manufactured within twelve months of the inflator manufacturing date. Prior to installation in the inflation devices the Explosive Component shall be subjected to the following inspections.

3.4.1.1 CONAX Design. For Conax P/Ns 1812-173-02 and 1812-181-01, Primer P/N CC-114-01 is defined as a primary component.

3.4.1.2 STRATUS Design. For Stratus P/Ns 01-0-04-100-0AA and 01-0-04-200-0AA, EED Assembly P/N 15-9-04-110-0AA is defined as a primary component.

3.4.2 Inspections. Prior to installation in the inflation devices each Explosive Component shall be subjected to the following inspections.

3.4.2.1 Bridgewire Resistance. The bridgewire resistance of each explosive component shall be tested per 4.6.1 prior to installation.

3.4.2.1.1 CONAX Design. For Primer P/N CC-114-01, the bridgewire resistance shall be between 2.0 and 5.0 ohms.

3.4.2.1.2 STRATUS Design. For EED Assembly P/N 15-9-04-110-0AA, the bridgewire resistance shall be 3 ± 1.0 ohms.

3.4.2.2 Radiographic Inspection. The Explosive Components shall be free of imperfections when examined in accordance with 4.6.2.

3.4.2.3 Ballistic Acceptance Tests. The Explosive Components shall have been ballistically tested and accepted per the contractors acceptance procedure as approved by the Government Design Activity.

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3.5 Battery. Batteries shall have been manufactured within 48 months of the delivery date. Batteries shall be included with inflators delivered for first article or conformance testing. Batteries installed in inflation devices shall have a voltage of 12.0 Volts minimum when measured per 4.6.5.

3.6. Elastomeric Materials. Elastomeric materials shall have been manufactured within 12 months of installation in the inflation device.

3.7 Leakage at 40 PSIG. The inflation devices shall not show any evidence of leakage when tested per 4.6.8.

3.8 Manual Operation.

3.8.1 Lever Operation Without CO₂ Cylinder. Each inflation device shall fully stroke the piercing pin when tested per 4.6.9.1.

3.8.2 Lever Operation With CO₂ Cylinder. Sample inflation devices shall fully stroke the piercing pin, perforate the CO₂ cylinder and release the CO₂ gas when tested per 4.6.9.2.

3.9 Bleed Circuit Resistance. The bleed circuit resistance of each inflation device shall be accepted per the contractors manufacturing or acceptance test procedures as approved by the Government Design Activity (see 3.3).

3.10 Visual Examination. Each inflation device shall conform to Drawing 30003-849AS222. Each inflation device shall be free of external damage; defects such as cracks, dents, corrosion, illegible or incomplete markings; missing or misassembled parts when inspected per 4.6.3.

3.11 Radiographic Inspection. The inflation devices shall be free of imperfections when examined in accordance with 4.6.4.

3.12 Sensor Assembly Function Test. Each sensor assembly shall be electrically tested and accepted per the contractors manufacturing and acceptance test procedures as approved by the Government Design Activity (see 3.3).

3.13. Electrostatic Discharge. Inflation devices shall be subjected to electrostatic discharge testing per paragraph 4.6.6 The inflation devices shall not function or dud as a result of being subjected to electrostatic discharge.

3.14 Environmental Tests.

3.14.1 Temperature and Humidity Cycling (T&H). The inflation devices with batteries installed, shall not function, or otherwise be adversely affected when tested per 4.6.7.1.

3.14.2 Vibration. The inflation devices with batteries and cylinder removed, shall not function, or otherwise be adversely affected when tested per 4.6.7.2.

3.14.3 Rain. The inflation devices with batteries installed, shall not function, or otherwise be adversely affected when tested per 4.6.7.3.

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3.14.4 Salt Fog. The inflation devices with battery installed shall not function or otherwise be adversely affected when tested per 4.6.7.5.

3.14.5 Extended Temperature. The inflation devices with battery installed shall not function or otherwise be adversely affected when tested per 4.6.7.6, and 4.6.7.7.

3.14.6 Hydrostatic Pressure. The inflation devices with battery installed shall not be adversely affected when tested per 4.6.7.8.

3.14.7 Differential Pressure. The inflation devices with battery installed shall not function or otherwise be adversely affected when tested per 4.6.7.9.

3.14.8 Impact. The inflation devices with battery installed shall not function or otherwise be adversely affected when tested per 4.6.7.10.

3.14.9 No Fire Sensitivity. The inflation devices with battery installed, shall not function, or otherwise be adversely affected when tested per 4.6.7.4.

3.15 Automatic Operation. Inflation devices shall meet the following requirements when tested per 4.6.11.

3.15.1 Function Time. The inflation devices shall function within three seconds after immersion in water per 4.6.11.1.

3.15.2 Gas Release. The CO₂ gas shall be fully released. The CO₂ gas shall not pass through any part of the inflation device other than the gas passages in the outlet port per 4.6.11.1.2.

3.15.3 Piercing Pin. The piercing pin of the FLU-12/P shall fully stroke and remain in the fully stroked position after automatic inflation per 4.6.11.1.3.

3.15.4 Integrity. No part of the inflation device shall rupture or fragment per 4.6.11.1.4.

3.16 Workmanship. Inflation devices shall be constructed and finished in a manner to assure compliance with all requirements of this specification and associated drawings. Particular attention should be directed to cracks, voids, foreign matter, missing or improperly assembled components, cracked, flaked or insufficient surface coatings, material defects, illegible or incorrect markings, corrosion, or mechanical defects such as burrs, sharp edges, and dents.

4. VERIFICATION

4.1 Classification of inspections.

- a. First article inspection (see 4.3.2)
- b. Quality conformance inspection (see 4.5)

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4.2 Sampling. Unless otherwise specified, and when applicable, the sampling plans and procedures used in the determination of the acceptability of products submitted by a supplier shall be in accordance with the provisions of ASQC Z1.4. Unless otherwise specified in the contract, order, or requisition, all samples for test purposes shall be provided at the expense of the contractor.

4.3 Lots.

4.3.1 Inspection lots. Inspection lot definition, and formation shall be in accordance with ASQC Z1.4.

4.3.2 First article inspection. Before entering into quantity production, an acceptable first article sample of 19 FLU-12/P inflation devices, and 19 batteries shall be prepared. This sample, manufactured using the same methods and procedures proposed for the production lot, is for the purpose of determining that the contractor, prior to starting production, is capable of producing items which comply with the technical requirements of the contract. Fourteen of these inflation devices shall be expended in the tests listed in Table I and five shall be retained for investigative purposes. A first article sample acceptable for environmental and functional testing shall be defined as a sample which has met the requirements of Table II of this specification. The contractor shall deliver the inflation devices to the activity designated by the contracting agency for test. First article sample acceptance shall consist of the tests shown in Table I in the order specified. Any quantity production prior to notification by the contracting agency of first article sample acceptability shall be at the contractor's risk. The first article inflation devices will not be applied as a part of the quantity specified for delivery by the contract

4.3.3 Production lot. Lot numbers shall be in accordance with MIL-STD-1168. Inflation devices required for all test purposes are randomly selected from the production lot and will not be applied as a part of the quantity specified for delivery by the contract. Verify primary component lot number and age, and elastomer age by visual inspection of manufacture date. Inflation devices selected for the ballistic test shall be delivered to the activity designated by the contracting agency. The designated test activity shall perform the tests and examinations listed in Table III to determine lot acceptance.

4.4 Classification of characteristics. The characteristics verified by the tests and examinations herein are classified as Critical, Major or Minor in accordance with DOD-STD-2101. Tests and examinations that verify critical characteristics are identified by the symbol (C) and major characteristics by the symbol (M). The number following the classification symbol indicates the serial number of test or examination. Tests and examinations which are not annotated with a classification code are classified minor.

4.5 Quality conformance inspection. Quality conformance inspection shall consist of a lot inspection of all inflation devices per Table II and a sample lot acceptance per Table III. Any inflation device which does not meet the requirements of each test and examination in Table II shall be removed from the production lot. The lot acceptance test sample shall be selected per Table IV. Lot acceptance inflation devices subjected to the tests of Table III in the order shown. Any failure shall reject the lot.

4.5.1 Packing, packaging and marking. The inspector shall ascertain that the packing and packaging of the inflation devices and the container markings conform to Section 5 of this specification.

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4.6 Tests.

4.6.1 Bridgewire resistance. The bridgewire resistance shall be measured with a test circuit which limits the bridge current to 5 milliamperes, maximum. A suitable instrument which is known to be accurate within one percent in the range of resistance specified shall be used to determine whether or not the requirement is met. Any explosive component not meeting requirements of 3.4.2.1 shall be rejected.

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Table I. First Article Tests

| Test/ Inspection | Requirement Paragraph | Procedure Paragraph | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | |
|-----------------------|-----------------------|---------------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|---|
| Visual | 3.10 | 4.6.3 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Radiographic | 3.11 | 4.6.4 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Battery Voltage | 3.5 | 4.6.5 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| T&H | 3.14.1 | 4.6.7.1 | X | | | | | | | | | | | | | | | | | | | |
| Vibration | 3.14.2 | 4.6.7.2 | | X | | | | | | | | X | X | | | | | | | | | |
| Rain | 3.14.3 | 4.6.7.3 | | | X | | | | | | | | | | | | | | | | | |
| Salt Fog | 3.14.4 | 4.6.7.5 | | | | X | | | | | | | | | | | | | | | | |
| High Temperature | 3.14.5 | 4.6.7.6 | | | | | X | | | | | | | | | | | | | | | |
| Low Temperature | 3.14.5 | 4.6.7.7 | | | | | | X | | | | | | X | | | | | | | | |
| Hydrostatic Pressure | 3.14.6 | 4.6.7.8 | | | | | | | X | | | | | | | | | | | | | |
| Differential Pressure | 3.14.7 | 4.6.7.9 | | | | | | | | X | | | | | | | | | | | | |
| Impact | 3.14.8 | 4.6.7.10 | | | | | | | | | X | | | | | | | | | | | |
| No Fire Sensitivity | 3.14.9 | 4.6.7.4 | X | | X | | | | X | | | X | | | X | X | | | | | | |
| Visual | 3.10 | 4.6.3 | X | X | X | X | | | X | X | X | X | X | X | X | X | | | | | | |
| Radiographic | 3.11 | 4.6.4 | X | X | X | X | | | X | X | X | X | X | X | X | X | | | | | | |
| Battery Voltage | 3.5 | 4.6.5 | X | X | X | X | | | X | X | X | X | X | X | X | X | | | | | | |
| Function at -20 F | 3.15 | 4.6.11.1 | | | | | | X | | | | | | | | X | | | | | | |
| Function at 70 F | 3.15 | 4.6.11.1 | X | X | X | X | | | X | X | X | X | X | X | | | | | | | | |
| Function at 120 F | 3.15 | 4.6.11.1 | | | | | X | | | | | | | | X | | | | | | | |
| Retained Sample | 4.3.2 | | | | | | | | | | | | | | | | X | X | X | X | X | X |

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TABLE II. Lot Inspections.

| Item | Nature of test | Requirement | Test method | Classification (DOD-STD-2101) |
|-----------------------|--------------------------------|-------------|-------------|-------------------------------|
| Primary component | Primer Age | 3.4.1 | 4.3.3 | (M101) |
| Primary component | Single lot verification | 3.4 | 4.3.3 | (M102) |
| Primary component | Bridgewire Resistance | 3.4.2.1 | 4.6.1 | (M103) |
| Primary component | Radiographic Inspection | 3.4.2.2 | 4.6.2 | (M104) |
| Primary component | Ballistic Acceptance | 3.4.2.3 | 4.3.3 | (C1) |
| Elastomeric Materials | Age | 3.6 | 4.3.3 | (M105) |
| Inflation Device | Leakage | 3.7 | 4.6.8 | (M106) |
| Inflation Device | Manual Operation w/o Cylinder | 3.8.1 | 4.6.9.1 | (M107) |
| Inflation Device | Manual Operation with Cylinder | 3.8.2 | 4.6.9.2 | (M108) |
| Inflation Device | Bleed Circuit Resistance | 3.9 | 4.6.10 | (M109) |
| Inflation Device | Radiographic Inspection | 3.11 | 4.6.4 | (M110) |

Table III. Sample Lot Acceptance Tests.

| Item | Nature of test | Requirement | Test method | Quantity | Classification (DOD-STD-2101) |
|------------------|---------------------------------|-------------|-------------|----------|-------------------------------|
| Inflation Device | Radiographic Inspection | 3.11 | 4.6.4 | All | (M110) |
| Inflation Device | Visual Examination | 3.10 | 4.6.3 | All | (M111) |
| Inflation Device | Battery Voltage | 3.5 | 4.6.5 | All | (M112) |
| Inflation Device | No Fire Sensitivity | 3.14.9 | 4.6.7.4 | All | (M113) |
| Inflation Device | Battery Voltage | 3.12 | 4.6.5 | All | (M112) |
| Inflation Device | Automatic Operation | 3.15 | 4.6.11 | All | (C2) |
| Inflation Device | Packing, Packaging, and Marking | Section 5 | 4.5.1 | All | (M114) |

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Table IV. Lot Sample Selection

| Lot Size | Sample Size | Retain |
|-------------|-------------|--------|
| 26 to 90 | 5 | 2 |
| 91 to 150 | 8 | 2 |
| 151 to 280 | 13 | 2 |
| 281 to 500 | 20 | 2 |
| 501 to 700 | 24 | 2 |
| 701 to 900 | 28 | 2 |
| 901 to 1200 | 32 | 2 |

4.6.2 Explosive Component Radiographic Examination. Each explosive component shall be radiographically examined in accordance with ASTM E 1742/E 1742M; any observable imperfections in assembly shall be cause for rejection. The explosive components shall be positioned on their sides for the most revealing exposure with the plane of the pins perpendicular to the X-ray source. All explosive components shall be identified utilizing a unique numbering system prior to examination. The explosive components shall be arranged sequentially on tray boards utilizing this system. Each radiographic plate shall carry a permanent means enabling identification of individual explosive components displayed there on. The radiograph identification shall include the complete lot number and the span of numbers displayed. Discontinuities in the numbering sequence shall be identified on the X-ray. Defective explosive components found by the vendor shall be clearly identified on the X-ray and those defectives removed from the production lot. Vendor shall retain the explosive component radiographs.

4.6.3 Visual Examination. Inflation devices shall be visually examined and meet the requirements of 3.10.

4.6.4 Radiographic Examination. Each inflation device shall be radiographically examined in accordance with ASTM E 1742/E 1742M; any observable imperfections in assembly shall be cause for rejection. The inflation devices shall be positioned on their sides for the most revealing exposure with the plane of the lever perpendicular to the X-ray source. All inflation devices be identified with serial numbers prior to examination. The inflation device serial numbers shall be in consecutive order beginning with the lowest number in each production lot. The inflation devices shall be arranged on tray boards in consecutive numerical order, and each radiograph shall carry a permanent identification of the inflation devices displayed thereon. The radiograph identification shall include the complete lot number, and serial numbers displayed. Discontinuities in serial numbers shall be identified on the X-ray. Defective inflation devices found by the vendor shall be clearly identified on the X-ray and those defectives removed from the lot.

4.6.5 Battery Voltage. Battery age shall be verified by inspection of manufacturers manufacture date. Batteries shall be installed in inflation devices for the battery voltage test. The voltage of each inflation device shall be tested per the contractors manufacturing or acceptance test procedures as approved by the Government Design Activity (see 3.3). Batteries that do not meet the requirements of 3.5 shall be replaced.

4.6.6 Electrostatic Discharge. The inflation devices, with batteries installed, shall be subjected to electrostatic discharge testing per MIL-DTL-23659 except that half of the inflators shall be subjected to discharges using a 500 Ohm resistor instead of a 5000 Ohm resistor in the test circuit. The discharge shall be applied between the end of the sensor and the body of the inflation device. The discharges shall be applied in both directions, or polarities.

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4.6.7 Environmental Tests.

4.6.7.1 Temperature and Humidity Cycling (T&H). The inflation devices shall be supported on screen trays so that all areas are exposed to the prescribed atmospheric conditions at all times. The cycling scheduling is as follows:

| | | |
|-----------|------|--|
| Monday | 0800 | Place test items in a chamber maintained at +70°F at 50 percent relative humidity (RH). |
| | 1200 | Raise chamber temperature to +120°F and the RH to 95 percent. The chamber temperature shall reach +120°F at 95 percent RH not later than 1300. |
| | 1600 | Remove test items from above chamber and immediately place in a chamber maintained at -20°F. |
| Tuesday | 0800 | Remove test items from above chamber and immediately place in a chamber maintained at +70°F at 50 percent RH. |
| | 1200 | Remove test items from above chamber and immediately place in chamber maintained at -20°F. |
| | 1600 | Remove test items from above and immediately place in a chamber maintained at 120°F at 95 percent RH. |
| Wednesday | 0800 | Reduce chamber temperature to +70°F at 50 percent RH. The chamber temperature shall reach +70°F at 50 percent RH not later than 0900. |
| | 1200 | Raise chamber temperature to +120°F at 95 percent RH. The chamber temperature shall reach +120°F at 95 percent RH not later than 1300. |
| | 1600 | Remove test items from above chamber and immediately place in a chamber maintained at -20°F. |
| Thursday | 0800 | Remove test items from above chamber and immediately place in a chamber maintained at +70°F at 50 percent RH. |
| | 1200 | Remove test items from the above chamber and immediately place in a chamber maintained at -20°F |
| | 1600 | Remove test items from above chamber and immediately place in a chamber maintained at +120°F at 95 percent RH. |

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| | | |
|--------|------|--|
| Friday | 0800 | Reduce chamber temperature to +70°F at 50 percent RH. The chamber temperature shall reach +70°F at 50 percent RH not later than 1300. |
| | 1200 | Raise chamber temperature to +120°F at 95 percent RH. The chamber temperature shall reach +120°F at 95 percent RH not later than 1300. |
| | 1600 | Remove test items from above chamber and immediately place in a chamber maintained at -20°F. |

This schedule shall be followed for a total of 4 weeks (28 days) except that on the second and fourth weekends the soak time shall be from 1200 on Friday until 0800 on Monday at a temperature of +120°F at 95 percent RH. Evidence of cracks, deformation, distortion, function, or any other flaws shall be cause for rejection.

4.6.7.2 Transportation Vibration. Vibration of the inflation device shall be equally divided at -20°F, 70°F, and 120°F. The inflation device without battery or CO₂ cylinder shall be mounted on a suitable fixture that allows vibration in 3 mutually perpendicular axes. In each axis a resonance survey shall be conducted and the resonance points noted, see 6.5.2. A vibration dwell shall be conducted for 30 minutes at each of the 4 most severe resonance points. The dwell shall be peaked in case the resonant point shifts. After resonant dwell the inflation device shall be vibration cycled for the time shown in Table V. The vibration cycling shall be sinusoidal vibration to the levels shown in Figure 1. The frequency shall be logarithmically swept from 5 Hz to 2000 Hz and return to 5 Hz in 20 minutes. Evidence of cracks, deformation, distortion, function, or any other flaws shall be cause for rejection.

4.6.7.3 Rain. The inflation devices shall be placed on plastic screen trays to allow air to circulate freely, water to drain easily, and exposing all surfaces to the environment. The rainfall rate shall be adjusted to 4 ± 1 inches per hour. The rain water conductivity shall be 350 ± 35 micromho/cm. These conditions shall be maintained for 30 minutes. The tray shall then be rotated 90 degrees and the test repeated. The tray shall be rotated and the test repeated until all 4 sides have been tested. The inflation devices shall then be dried at 120°F for 24 hours.

4.6.7.4 No Fire Sensitivity. The inflation device shall be temperature conditioned at 70 ± 5°F for 4 hours minimum. A 160 K Ohm ± 10 percent resistor shall be connected between the sensor housing contact and the body of the inflator for 60 seconds minimum.

4.6.7.5 Salt Fog. The Inflation assembly shall be subjected to the conditions of the salt fog test per ASTM B117. The test duration is 48 hours and then 48 hours drying. After testing, the assembly shall not show evidence of corrosion, nicks, cracks, loose particles, or other defects, nor shall the assembly be activated. Evidence of corrosion, nicks, cracks, loose particles, function, or other defects shall be cause for rejection.

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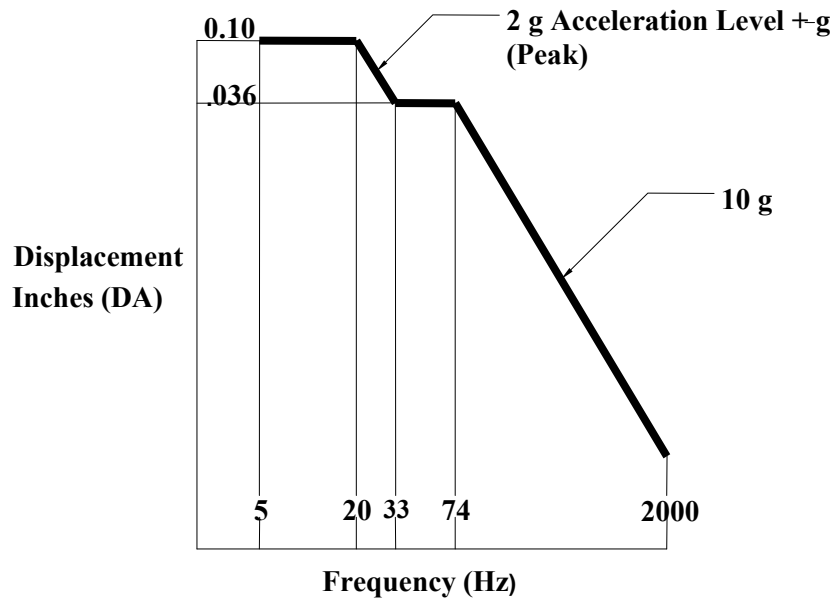


Figure 1. Vibration Test Levels

Table V. Vibration Test Schedule/Axis

| Resonances | 0 | 1 | 2 | 3 | 4 |
|------------------------------|-----|-----|-----|----|-----|
| Total Dwell Time (minutes) | 0 | 30 | 60 | 90 | 120 |
| Total Cycling Time (minutes) | 180 | 150 | 120 | 90 | 60 |

4.6.7.6 Extended High Temperature. The inflation device shall be temperature conditioned at $160 \pm 5^\circ\text{F}$ for 48.5 hours. The inflation device shall then be removed from the conditioning chamber and allowed to stabilize at $120 \pm 3^\circ\text{F}$. The inflation device shall then be immediately tested per 4.6.11. Evidence of cracks, flaking, deformation, distortion, splintering, or other defects shall be cause for rejection.

4.6.7.7 Extended Low Temperature. The inflation devices shall be temperature conditioned at $20 \pm 3^\circ\text{F}$ for 48.5 hours. The inflation devices shall then be removed from the conditioning chamber and be immediately tested per 4.6.11. Evidence of cracks, flaking, deformation, distortion, splintering, or other defects shall be cause for rejection.

4.6.7.8 Hydrostatic Pressure. A discharged carbon dioxide cylinder shall be inserted in the inflation assembly with a maximum torque of 20 inch pounds. The assembly shall be subjected to a hydrostatic pressure of 1500 ± 100 psig applied to the outlet of the assembly for five minutes minimum. Evidence of leakage or deformation of the body shall be cause for rejection.

4.6.7.9 Differential Pressure. The outlet port of the inflation device shall be blocked for this test. The inflation device equipped with a filled carbon dioxide cylinder shall be subjected to three cycles of surge air pressure of 40 ± 2 psig for a duration of 50 ± 20 milliseconds. Evidence of damage or function shall be cause for rejection.

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4.6.7.10 Impact. A CO₂ filled cylinder shall be fully installed in the inflation device hand tight. The inflation device shall be free fall dropped from a height of 4 feet minimum onto a fixed steel plate twice on each face. Evidence of cracks, deformation, distortion, function, or any other flaws shall be cause for rejection.

4.6.8 Leakage at 40 PSIG. Leakage test shall be performed on inflation devices without shear wire or batteries installed. Actuate the lever through one complete cycle and return it to its original position. A pressure of 40 ± 2 psig shall be applied at the primer port of the inflation device for 10 seconds minimum. While the pressure is applied, the inflation device shall be observed for leakage. Any detectable pressure drop shall be cause for rejection of the inflation device.

4.6.9 Manual Operation

4.6.9.1 Lever Operation Without CO₂ Cylinder. The cam lever shall not be secured to the body with shear wire. Move the cam lever through three cycles to minimize O-ring set. The inflation device shall be oriented vertically with the CO₂ cylinder inlet port up. The inflation device shall be rotated approximately 10 degrees in the direction of cam lever rotation. Attach a 3 ± 0.5 pound weight to the free end of the lever. The cam lever shall operate through one normal cycle. The piercing pin shall advance to its maximum point of travel and fully retract.

4.6.9.2 Lever Operation With CO₂ Cylinder. A CO₂ filled cylinder shall be fully installed in the inflation device hand tight. The shear wire shall not be installed. The CO₂ cylinder shall then be removed and its diaphragm face examined for any evidence of puncture or indentations by the piercing pin. Upon completion of this inspection the cylinder shall be reinstalled in the inflation device. The inflation device shall be oriented vertically with the CO₂ cylinder up. Attach a 15 ± 0.5 pound weight to the free end of the lever. The piercing pin shall advance to its maximum point of travel, pierce the diaphragm of the CO₂ cylinder and release the CO₂ gas. This test shall be applied to two units minimum out of every 50. Any inflation device that does not meet the requirements of 3.8.2 shall be rejected.

4.6.10 Bleed Circuit Resistance. The bleed circuit resistance shall be tested per the contractors manufacturing or acceptance test procedures as approved by the Government Design Activity (see 3.3). If the resistance reading is not per 3.9, the inflation device shall be rejected.

4.6.11 Automatic Operation

4.6.11.1 Functional Test. The inflation devices shall be equally divided for temperature conditioning at $-20 \pm 5^\circ\text{F}$, $70 \pm 5^\circ\text{F}$, or $120 \pm 5^\circ\text{F}$ for a minimum of four hours. The inflation devices shall be functioned within three minutes after removal from temperate conditioning. The inflation devices shall be functioned by immersion in water at $32^\circ\text{F} + 5^\circ\text{F}$, -0°F and $100 + 50, -10$ micromho/centimeter conductivity. The time from immersion in water to start of release of CO₂ gas shall be measured.

4.6.11.1.1 Acceptance criteria. The total number of allowed defective units in a first article sample or lot acceptance sample shall be zero. Any defects will reject the lot represented. Screening of defects as a corrective action is at contractor's expense and the method of screening shall be subject to approval by the contracting officer.

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4.6.11.1.2 Gas Release. The functioned inflation devices shall be inspected for complete release of gas from the CO₂ cylinder through the outlet port, see 3.15.2.

4.6.11.1.3 Piercing Pin. The functioned inflation devices shall be inspected for complete stroke of the piercing pin, see 3.15.3.

4.6.11.1.4 Integrity. The functioned inflation devices shall be inspected for integrity, see 3.15.4.

4.6.11.1.5 Retest. There shall be no retests.

4.6.11.1.6 Test failure. If a test failure is attributable to an assignable cause, excluding the inflation devices, the original individual test results should be discarded and the complete test reconducted.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DOD personnel 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.

6. NOTES

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

6.1 Intended use. The FLU-12/P Inflation Device is designed to inflate life preservers either manually or automatically by opening a CO₂ cylinder and releasing the gas into the life preserver through an outlet. This inflation device was designed for military use and has no commercial application.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of the specification.
- b. If required, the specific issue of individual documents referenced (see 2.2.1 and 2.2.2).
- c. Designation of inflation device (FLU-12/P)
- d. Whether first article inspection is required and, if so, specify the test activity.
- e. Production lot size and test activity (see 4.3.3).
- f. Items of data required for each first article and production lot (see 6.3)
- g. Packaging and marking (see 5.1 and 6.4).

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- h. That the safety precaution requirements of the "Contractors' Safety Manual for Ammunition, Explosives, and Related Dangerous Material," DOD 4145.26M are applicable. NOTE: When this specification is used as part of the description of work to be accomplished by a Government activity, the safety precaution requirements of "Ammunition Ashore," OP 5 are applicable.

6.3 Data. For the information of contractors and contracting officers, any of the data specified in (a) subparagraphs below, (b) applicable documents listed in section 2 of this specification or (c) referenced lower-tier documents need not be prepared for the Government unless specified in the contract or order.

6.3.1 Standard deliverables. In addition to the delivery of Inflation devices, the contract may require delivery of the following:

- a. Radiographic plates of FLU-12/P Inflators
- b. Radiographic review report
- c. Radiographic DLAT sample plates and techniques
- d. Requests for waiver/deviation and engineering change proposal (ECP)
- e. Progress and management report
- f. Test and inspection report if contractor tested
- g. Ammunition data cards

6.4 Contract packaging and marking. The following packing and marking requirements should be specified in the contract.

6.4.1 Preservation and packing. Level A and commercial preservation/packing should be in accordance with the Code of Federal Regulation 49 CFR 171-179. The contractor is be responsible for performance oriented packing certification and documentation in accordance with Regulation 49 CFR 171-179. Level A preservation and packing should be used for packaging of all production lots. Inflation devices should be packaged in an inner container in accordance with Drawing SPI 520-174-0272. Inner containers should be packed in the outer container in accordance with Drawing SPI 520-174-0272. For an explanation of terms see 6.4.2.

6.4.2 Explanation of terms. For the purpose of this specification, NAVSUPINST 4030.28 (20 June 1975) paragraphs 1-4, 2-2, 203 and Appendix A, when applicable, is used to clarify terms.

6.4.3 Markings.

6.4.3.1 Special markings. Marking of exterior containers should be in accordance with 49 CFR 171-179. Markings should be applied by the contractor or his agent.

6.4.3.2 Normal markings. Unless otherwise specified in the contractor order, the marking information on unit packages and shipping containers should be as specified on Drawing SPI 520-174-0272. The specified marking information should be applied to the containers in accordance with the applicable provisions of MIL-STD-129. Lot number should be in accordance with MIL-STD-1168.

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6.5 Definition.

6.5.1 Function Time. The time from immersion of the inflation device in water to start of release of CO₂ gas.

6.5.2 Resonance. The ratio of vibration output versus input of 2 or greater.

6.6 Subject term (keyword) listing.

inflator

6.7 Changes from previous issue. Marginal notations are not used to identify changes with respect to the previous issue because of the extensiveness of the changes.

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NOTE: The activities listed above were 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.daps.dla.mil/>.