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MILITARY SPECIFICATION

BOMB, BINARY CHEMICAL, EMPTY

(BLU-80/B)

This specification is approved for use by 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 establishes the manufacture and acceptance of the BLU-80/B Bomb, Chemical, Empty, critical item, referred to herein as the bomb in accordance with DL X4900592.

2. APPLICABLE DOCUMENTS.

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-W-52574	Welding Process and Welding Procedure Requirements for Manufacture of Equipment Utilizing Steel.
MIL-B-85252	Ballonet, Cartridge Activated (MXU-695/B).
MIL-C-85254	Charge, Linear Shaped.
MIL-M-85255	Motor, Hot Gas (MAU-132A/B)

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, Engineering Specifications and Standards Department (ESSD), Code 93, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

FSC 1325

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MIL-C-85257	Cord Assembly, Detonating
MIL-G-85258	Generator, Gas Pressure.
MIL-F-85328	Firing Device, Explosive Actuator.

STANDARDS

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-109	Quality Assurance Terms and Definitions.
MIL-STD-129	Marking for Shipment and Storage.
MIL-STD-810	Environmental Test Methods.
MIL-STD-45662	Calibration Systems Requirements.

DRAWINGS

Naval Air Systems Command
(Code Ident 30003)

479AS100	MARK 339 MOD 1 Fuze.
DL X4900537	Generator, Gas Pressure, Propellant Activated BBU-18/B.
DL X4900592	Bomb, Chemical, Empty.
DL X4900750	Motor, Hot Gas, MAU-132/B.
DL X4900810	Marking, Shipping, and Storage for BLU-80/B.
SA 2875560	Plug, Instrumentation.
X4900593	Reactor Explosive Loaded.
X4900594	Tail Fin Assembly.

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X4900623	Tube, Injector
X4900688	Fairing, Nose

PUBLICATIONS

Naval Air Systems Command
(Code Ident 30003)

AS-2671	Fuze, Mechanical Time MARK 339 MOD 1.

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

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

DEPARTMENT OF TRANSPORTATION

Code of Federal Regulations

49 CFR 171-178	Transportation.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.)

3. REQUIREMENTS.

3.1 Item description. The bomb consists of a weapon body which includes the reactor, central injector and power source, nose and tail assemblies, dissemination mechanism, and time fuze. Bomb design allows insertion of the MXU-695/B Ballonet at the last possible moment before loading on the aircraft. The bomb consists of the following major components:

a. Generator, gas pressure, propellant actuated BBU-18/B - Drawing X4900537.

b. Motor, hot gas MAU-132/B - Drawing X4900750.

c. Tail fin assembly - Drawing X4900594.

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d. Nose fairing - Drawing X4900688.

e. MARK 339 MOD 1 fuze - Drawing 479AS100.

f. Reactor, explosive loaded - Drawing X4900593.

3.2 Characteristics.

3.2.1 Performance.

3.2.1.1 Proof pressure. The bomb, after installation and function of the ballonet, shall withstand a minimum internal pressure of 350 pounds per square inch gage for 30 minutes minimum without any external leakage from the structure or physical degradation of any component or assembly.

3.2.1.2 Tail fin deployment. When the tail fin lanyard is extracted at a rate of 60 ±10 feet per second (ft/s) with a pull force of 45 ±5 pounds (lb), the tail fin firing device shall function the impulse cartridge after nine inches minimum of the lanyard is extracted. All four tail fins shall deploy and lock into an upright position within 30 milliseconds (ms) after the firing device activates the impulse cartridge.

3.2.1.3 Tail fin safety. When the tail fin safety flag is installed and a pull force of 200 ±10 lbs is applied to the tail fin lanyard, the lanyard shall not extract nor shall the tail fin firing device be activated.

3.2.1.4 Mixing. When the weapon is loaded with 22 ±0.05 gallons of a kinetic simulant in accordance with Table I, and ballonet function occurs in accordance with 3.2.1.5, the central injector shall rotate at 450 revolutions per minute minimum for a minimum of 15 seconds when powered by the hot gas motor (MAU-132A/B) and a gas pressure generator (BBU-18/B). A pressure-time history and a temperature-time listing as shown in Figure 1 shall result. No external leakage from the weapon shall occur during the mixing cycle and for 30 minutes minimum following the mixing cycle.

TABLE I. Kinetic simulant parameters.

Composition	Minimum	Maximum
Triisopropyl Phosphite	94%	
Diisopropyl Hydrogen Phosphite		2.5%
Specific Gravity 20/4°C	0.90	0.93
Refractive Index at 25°C	1.407	1.410
Color APHA		25
Turbidity APHA		10

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3.2.1.5 Ballonet function. When a ballonet (MXU-695/B) is installed into a Bigeye weapon (BLU-80/B), the following sequence of events shall occur upon activation of the gas generator. The hot gas motor when activated by the gas generator shall cause the central injector to rotate four to five complete 360 degrees (deg) turns. During the four to five complete 360 deg turns the impulse cartridge (CCU-13/B) shall be initiated due to the rotation of the central injector. The impulse cartridge shall cause the ballonet to expand. The expansion of the ballonet shall cause the material contained on the ballonet to be injected into the bomb reactor tank, due to the rupture of the scored segments of the injector tube (see Drawing X4900623).

3.2.1.6 Port opening. Upon initiation of the MARK 339 fuze, the explosive train shall cause the two forward ports to be completely severed from the weapon and the two aft ports to be severed so as to leave a hinge about which the port deflects into the weapon body.

3.2.2 Environmental. The weapon performance shall not be degraded below that specified in 3.2.1 after exposure to the following environments.

3.2.2.1 High temperature. Exposure to a high temperature of +74 degrees Celsius (°C) for 48 consecutive hours (see 4.4.3.1).

3.2.2.2 Low temperature. Exposure to a low temperature of -48°C for 24 consecutive hours (see 4.4.3.2).

3.2.2.3 Vibration. Exposure to the vibration schedule specified in Figure 2 in each of the three mutually perpendicular axes at a temperature of -40°C (see 4.4.3.3).

3.2.2.4 Shock. Exposure to half sine wave impact shocks in each of three mutually perpendicular axes having a peak amplitude of 25 gravity units (g) and a total duration of 11 ms (see 4.4.3.4).

3.2.2.5 Temperature cycling. Exposure to temperatures alternating between -40° and +60°C (see 4.4.4).

3.2.2.6 Humidity. Exposure to a relative humidity of up to 95 percent (see 4.4.3.5).

3.3 Design and construction.

3.3.1 Production drawings. The bomb shall be fabricated and assembled in accordance with the drawings, parts list, and other documents listed on DL X4900592.

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3.3.2 Standards of manufacture.

3.3.2.1 Certification. When specified in the contract or purchase order, the contractor shall include written certification to the procuring activity (see 6.2.2), accompanied by objective quality evidence, as defined in MIL-STD-109, that the materials, processes, and parts used in the assembly meet the applicable requirements for each item. Further, the certification shall attest that the following bomb subcomponents installed on each bomb meet the requirements specified:

Subcomponent	Specification
a. Detonating Cord Assembly	MIL-C-85257(AS)
b. Gas Generator	MIL-G-85258(AS)
c. Linear Shaped Charges	MIL-C-85254(AS)
d. Firing Device Explosive Actuator	MIL-F-85328(AS)
e. Hot Gas Motor	MIL-M-85255(AS)
f. Fuze, Mechanical Time, MARK 339 MOD 1	AS-2671

3.3.2.2 Manufacturing processes and procedures. When specified in the contract or purchase order, the contractor shall prepare, in his own format, written procedures for welding performed in the manufacture of the bomb. The procedures shall be in accordance with MIL-W-52574. The procedures shall reflect the requirements for welding specified on the applicable drawings as listed on DL X4900592. Copies of such procedures, together with referenced documents, shall be made available to the procuring activity in the manner specified in the contract or purchase order (see 6.2.2) for technical concurrence.

3.3.2.3 Working environments. Special working environments for the manufacture of the bomb and bomb components shall be as specified in Appendix A.

3.4 First article.

3.4.1 Preproduction sample. Unless otherwise specified in the contract or purchase order (see 6.2.1), a preproduction sample consisting of ten bombs shall be manufactured, filled in accordance with 4.2.3.1, and delivered to the testing activity designated in the contract or purchase order and subjected to the preproduction tests of 4.1.2.1. The preproduction sample shall be manufactured using the same methods, materials, processes, and procedures proposed for production. Any production prior to acceptance of the preproduction sample is totally at the contractor's risk. Any changes in design, materials or processes

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used in the manufacture of the preproduction sample shall be cause for resubmission of another preproduction sample for testing. Any such changes shall have prior written approval of the procuring activity.

3.4.2 Preproduction verification. At the discretion of the procuring activity (see 6.2.1), preproduction verification shall be repeated under any of the following conditions:

a. The manufacturer has modified his product (such as a change of raw materials, the process, production procedures, or methods). It shall be the responsibility of the contractor to notify the procuring activity prior to the incorporation of any such changes, and to provide quantitative evidence of the effect of such changes on the performance or characteristics of the product. Requirements for such tests shall be based on an evaluation of the evidence supplied.

b. Where there is evidence that the quality of the product has not been maintained. This evidence may be in the form of accumulated failure reports of the product, or failure of the product to pass any of the tests for production lot acceptance that may be conducted by or for the procuring activity.

c. Applicable documents have been amended or revised sufficiently so that continued validity of the previous preproduction testing is questionable.

d. The manufacturer has not produced bombs to this specification for a period of 12 months or longer.

e. The manufacturer has changed the location at which bombs are produced.

3.5 Documentation. When specified in the contract or purchase order (see 6.2.1), the following documents shall be prepared for the procuring activity:

a. Certification (see 3.3.2.1, 4.1.2.2, and 4.2.5).

b. Inspection (see 4.1.2.2, and 4.2.5).

c. Manufacturing documentation (see 3.3.2.2).

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3.6 Workmanship. As a minimum, the bomb shall be manufactured, inspected, and tested under conditions meeting the requirements of 3.3.1, 3.3.2.3, and as specified herein. The bomb shall be fabricated in a manner that will ensure compliance with all requirements of this specification and the appropriate assembly drawings listed in Section 2.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order (see 6.2.1), 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 Classification of inspection. The inspection requirements specified herein are classified as follows:

a. Preproduction inspection (see 4.1.2.1).

b. Quality conformance inspection (see 4.2).

4.1.2 Special tests and examinations.

4.1.2.1 Preproduction inspections. Preproduction inspection shall be conducted on the preproduction sample (see 3.4.1) and shall consist of the examinations and tests of Table II in the order shown.

4.1.2.1.1 Acceptance criteria. Failure to pass any test specified shall cause rejection of the preproduction sample and preproduction lot.

4.1.2.1.2 Combined testing. Preproduction inspections of the bomb and ballonet, in accordance with MIL-B-85252, may be conducted concurrently upon approval of the procuring activity (see 6.2.1).

4.1.2.2 Preproduction inspection report. When specified in the contract or purchase order (see 6.2.2), results of the preproduction inspections shall be prepared for the procuring activity. The report shall contain the following information accompanied by a certification

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TABLE II. Preproduction inspections.

Examination or test	Requirement paragraph	Method paragraph
Group I		
Certification	3.3.2.1	4.4.2
Visual inspection	3.3.1, 3.6	4.4.1
Group II		
High temperature	3.2.2.1	4.4.3.1
Low temperature	3.2.2.2	4.4.3.2
Vibration	3.2.2.3	4.4.4.3
Shock	3.2.2.4	4.4.3.4
Humidity	3.2.2.6	4.4.3.5
Temperature cycle/performance	3.2.1.1, 3.2.1.2, 3.2.1.3, 3.2.1.4, 3.2.1.5, 3.2.1.6, 3.2.2.5	4.4.4

attests that the information provided is correct and applicable to the product being submitted:

a. A statement that the preproduction sample complies with all quality assurance provisions of this specification for the bomb specified in the contract or purchase order.

b. Number of units of product inspected.

c. Results obtained for all inspections performed.

d. Purchase descriptions or contract number and date, together with an identification and date of changes.

e. Certificates of compliance of all material procured directly by the contractor.

f. Date submitted.

The certification shall be signed by a responsible agent of the certifying organization. The certification shall be substantiated by evidence of the agent's authority to bind his principal.

4.2 Quality conformance inspections. Quality conformance inspections shall be performed on each inspection lot and shall consist of the examinations and tests listed in Table III in the sequence shown.

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TABLE III. Quality conformance inspections.

Examination or test	Requirement paragraph	Method paragraph
Group I		
Certification	3.3.2.1	4.4.2
Visual inspection	3.3.1, 3.6	4.4.1
Group II		
Vibration	3.2.2.3	4.4.3.3
Shock	3.2.2.4	4.4.3.4
Group III		
Temperature cycle/performance	3.2.1.1, 3.2.1.2, 3.2.1.3, 3.2.1.4, 3.2.1.5, 3.2.1.6, 3.2.2.5	4.4.4

4.2.2 Inspection lot. Unless otherwise specified herein, inspection lot definition shall be in accordance with MIL-STD-105. An inspection lot shall be formed from bombs which have passed Group I inspections. An inspection lot shall not contain more than 250 bombs.

4.2.3 Sampling. Six bombs shall be randomly selected from each inspection lot and subjected to Group II and III tests of Table II. When four consecutive lots have passed Group II and III tests without any failures, the sample size shall be reduced to four bombs selected from each lot. Sample size shall return to six items per lot in the event of any failure during Group II and III tests and shall remain at six items until four consecutive lots pass Group II and III tests without failure.

4.2.3.1 Sample preparation. Each bomb in the sample shall be filled with 22 ±0.05 gallons of a kinetic simulant in accordance with Appendix A. The bomb shall be closed using a plug, Drawing SA2875560, and instrumentation attached so as to monitor bomb internal pressure and temperature. In order to perform the functional tests of this specification it is necessary to have an all-up weapon. It will be necessary to have a ballonet, in accordance with MIL-B-85252, inserted into each bomb prior to the performance of the temperature cycle/performance testing. Further, upon approval of the procuring activity (see 6.2.1) quality conformance testing of the MXU-695/B ballonet in accordance with MIL-B-85252 shall be conducted in conjunction with quality conformance

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tests for the bomb as specified herein. When bomb and ballonet quality conformance tests are conducted concurrently, the acceptance criteria established herein and in accordance with MIL-B-85252 shall be met in order for the lot of bombs and lot of ballonets represented to be acceptable.

4.2.4 Acceptance criteria. Failure of any bomb in the sample to pass the Group II and III tests in the sequence shown, shall cause rejection of the lot represented.

4.2.5 Quality conformance inspection report. When specified in the contract or purchase order (see 6.2.2), results of the quality conformance inspection shall be prepared with each lot. Reports shall contain the following information accompanied by a certification which attests that the information provided is correct and applicable to the product being submitted:

a. A statement that the lot complies with all quality assurance provisions of this specification for the bomb specified in the contract or purchase order.

b. Number of units of product inspected.

c. Results obtained for all inspections performed.

d. Purchase descriptions or contract number and date, together with an identification and date of changes.

e. Certificates of compliance of all material procured directly by the contractor.

f. Number of items in the lot.

g. Date submitted.

The certification shall be signed by a responsible agent of the certifying organization. The initial certification shall be substantiated by evidence of the agent's authority to bind his principal. Substantiation of the agent's authority will not be required with subsequent certifications unless, during the course of the contract, this authority is vested in another agent of the certifying organization.

4.3 Test equipment and conditions.

4.3.1 Standard test equipment. The contractor shall provide and maintain an adequate system of inspection and test equipment necessary to ensure that parts and products will meet the contract or purchase

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order, specification, and drawing requirements at the rate of delivery specified in the contract or purchase order. The calibration of measuring and test equipment shall conform to MIL-STD-45662. Test equipment, including associated calibration programs, and operation and maintenance procedures, are subject to disapproval by the procuring activity. When special test equipment and circuits are devised or commercially available equipment is employed, all test equipment circuits and methods are subject to disapproval by the procuring activity. Unless otherwise specified herein, the magnitude of any error introduced by test equipment shall be not greater than 10 percent of the tolerance of the requirement being measured.

4.3.2 Test conditions. Unless otherwise specified herein, all tests shall be conducted at the test area at ambient temperature and relative humidity. Where special conditions of tests are specified, equipment employed shall adequately provide specified conditions; and all monitoring and measurement devices shall conform to the requirements of 4.3.1. When special conditions of tests are not imposed, commercially available direct-measurement equipment shall be employed provided they conform to the requirements of 4.3.1.

4.4 Test methods.

4.4.1 Visual inspection. Each bomb shall be inspected for conformance to the documents and workmanship requirements of 3.3.1 and 3.6.

4.4.2 Certification. The contractor shall have available written certification accompanied by objective quality evidence (as defined in MIL-STD-109) that the requirements of 3.3.1, 3.3.2 and 3.6 are met.

4.4.3 Environmental tests.

4.4.3.1 High temperature. The bomb shall be subjected to the high temperature test of MIL-STD-810, Method 501.1, Procedure I, except the temperature shall be 74°C. Steps 4 and 5 shall be omitted.

4.4.3.2 Low temperature. The bomb shall be subjected to the low temperature test of MIL-STD-810, Method 502.1, Procedure I, except the temperature shall be -48°C. Steps 4 and 5 shall be omitted.

4.4.3.3 Vibration. The testing shall be conducted in accordance with MIL-STD-810, Method 514.2. The bomb shall be vibrated in each of three mutually perpendicular axes for a period of 2 hours minimum for each axis at a temperature of -40 ±3°C. The vibration test profile shall be in accordance with Figure 2. The tolerance on vibration test levels shall be in accordance with MIL-STD-810, Method 514.2, paragraph 4.5.2. Testing shall be accomplished with a ballonet, in accordance with MIL-B-85252, inserted into the bomb.

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4.4.3.4 Mechanical shock. Testing shall be performed in accordance with MIL-STD-810, Method 516.2. Testing shall be conducted by applying three shocks in each direction (18 shocks total) through three mutually perpendicular principal axes at a temperature of -40 ±3°C, as follows:

a. The shock pulse signature shall be a half sine pulse, 15 g's peak and 11 ms duration. The shock pulse tolerance limits shall be in accordance with MIL-STD-810, Method 516.2, Figure 516.2-2.

b. Before applying mechanical shocks, the bomb shall be temperature conditioned at -40 ±3°C for not less than 4 hours or more than 12 hours. If the bomb must be removed from the chamber to apply the required shocks, the elapsed time between removal from the chamber and the start of application of any shock along any axis shall not exceed 3 minutes. If the bomb is transferred from the temperature conditioning chamber to a temperature conditioned insulated box which is at the same temperature, the elapsed time between removal from the chamber and start of application of any shock along any axis may be increased to 5 minutes, provided the bomb is not exposed to ambient temperature for more than 3 minutes of the 5-minute period. If shock testing is not completed within the time limits specified, the bomb shall be returned to the conditioning chamber for not less than 1 hour before shock tests are resumed.

4.4.3.5 Humidity. Testing shall be conducted in accordance with MIL-STD-810, Method 507.1, Procedure II. The test item shall be non-operating during the test and shall be visually inspected upon completion of the test.

4.4.4 Temperature cycle/performance. Testing shall be conducted with a ballonet in accordance with MIL-B-85252 inserted into the bomb. The bomb shall be stabilized at -40°C for 1 hour. The bomb sample shall be divided in half. One half of the sample shall be transferred to a +60°C chamber and conditioned to +60°C for 1 hour. The remaining half shall be maintained at -40°C. The bomb samples shall then be activated. The conditioned temperature shall be as follows:

a. The gas generator shall then be initiated by the application of 28 ±1 volt direct current to the electrical connector. Upon completion of the mixing cycle, the tail fins shall be deployed by extracting the tail fin arming wires at a rate of 60 ft/s with a pull force of 45 lbs. The fuze shall then be armed and functioned 15 to

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25 minutes after completion of the mixing cycle (see WARNING). To be acceptable the bomb shall meet the requirements of 3.2.1.1, 3.2.1.2, 3.2.1.4, 3.2.1.5, 3.2.1.6, and 3.2.2.5. Failure of any bomb in the sample to be acceptable shall cause rejection of the lot represented.

WARNING

The reaction products which result from the kinetic simulant and sulfur produce high temperatures. Caution should be exercised when the ports are opened. Further, regulations covering the environmental impact, handling, and disposal of the reaction products should be investigated prior to the conducting of this test.

High pressure buildups are possible due to secondary reactions which may occur. Appropriate safety measures should be observed during the conduct of this test.

5. PACKAGING.

5.1 Preservation - packaging.

5.1.1 Level A. The bomb shall be packaged and packed in accordance with DL X4900810.

5.2 Marking. All markings for containers shall be in accordance with DL X4900810. Any additional marking which may be necessary shall be in accordance with MIL-STD-129 and Code of Federal Regulations 49 CFR 171-178.

6. NOTES AND CONCLUDING MATERIAL.

6.1 Intended use. The bomb covered by this specification is intended for use as the filled (loaded) Binary Chemical Bomb, BLU-80/B.

6.2 Ordering data.

6.2.1 Procurement requirements. Procurement documents should specify the following:

a. Title, number, and date of this specification.

b. Manufacturing documentation (see 3.3.2.2).

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c. When a first article is required, it should be tested and approved under the appropriate provisions of 7-104.55 of the Defense Acquisition Regulations (DAR). The first article should be a preproduction sample consisting of 10 bombs as specified in 3.4.1. The contracting officer should include specific instructions in all procurement instruments, regarding arrangements for examinations, test and approval of the first article.

d. Preproduction verification, if required (see 3.4.2).

e. Responsibility for inspection (see 4.1).

f. Approval to conduct testing concurrently with ballonet testing (see 4.1.2.1.2 and 4.2.3.1).

6.2.2 Data requirements. When this specification is used in a procurement which incorporates a Contract Data Requirements List (DD Form 1423) and invokes the provisions of 7-104.9(n) of the DAR, the data requirements identified below will be developed as specified by an approved Data Item Description (DID) (DD Form 1664) and delivered in accordance with the approved DD Form 1423 incorporated in the contract. When the provisions of DAR 7-104.9(n) are not invoked, the data specified below will be delivered by the contractor in accordance with the contract requirements. Deliverable data required by this specification are cited in the following paragraphs:

Paragraph	Data Requirement	Applicable DID
3.3.2.1, 4.1.2.2, and 4.2.5	Certification of Compliance	DI-E-2121
4.1.2.2, 4.2.5	Inspection Report	DI-T-2072
3.3.2.2	Manufacturing Documentation	DI-T-5204

(Copies of DIDs required by the contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

6.3 Safety precautions. The loading, assembly, and handling of the explosives, subassemblies, and finished items covered by this specification involve hazardous operations and require explosive safety precautions. Standard safety precautions for explosive-loaded items are contained in DOD 4145.26M.

Preparing Activity:
Navy - AS
(Project 1377-N674)

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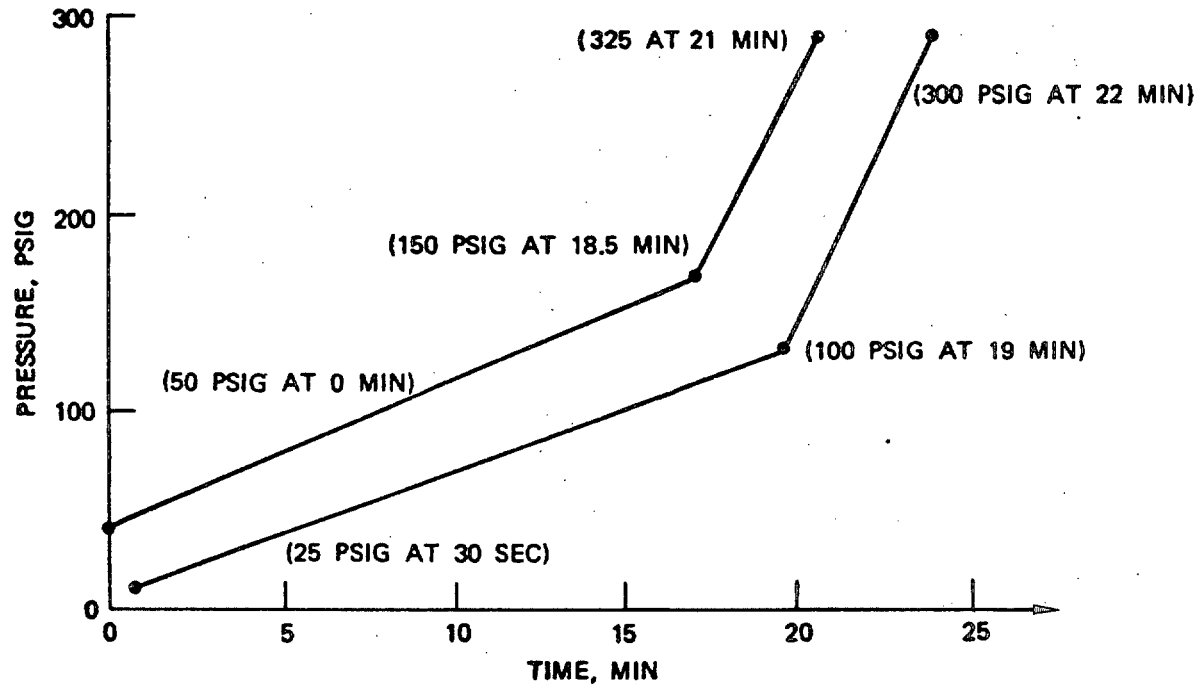

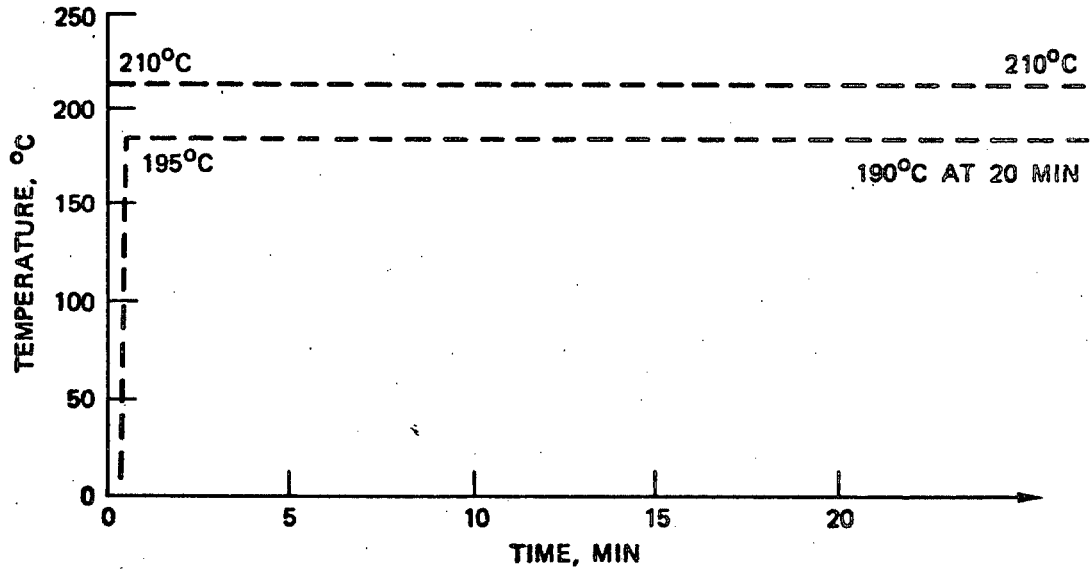

FIGURE 1. Pressure-time history and temperature-time listing.

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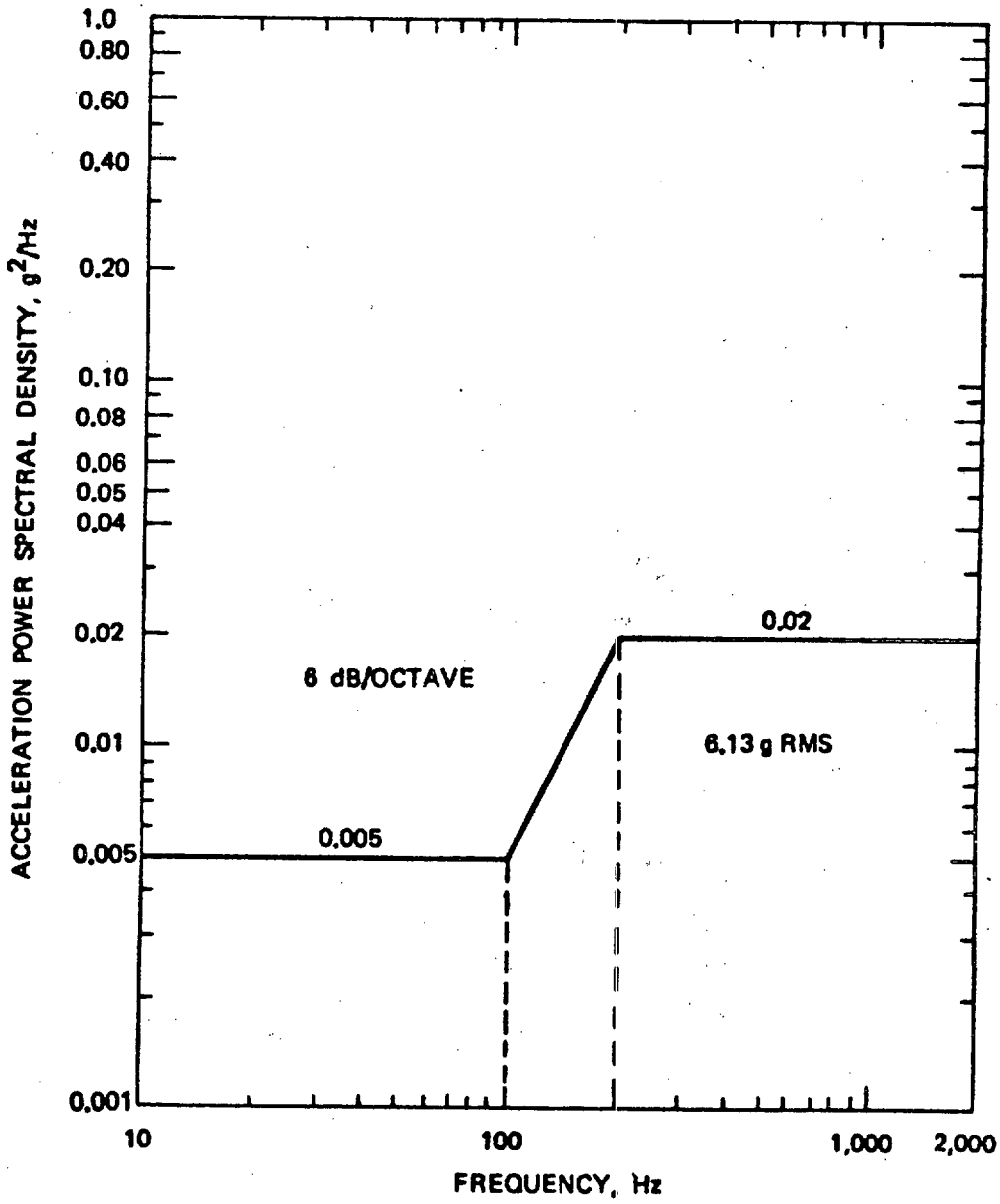

FIGURE 2. Vibration schedule.

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Appendix A

WORKING ENVIRONMENTS

10. SCOPE.

10.1 Scope. This appendix presents the minimum standards for the working environments necessary in manufacture and assembly of the Bigeye weapon system, and any component parts or assemblies associated with the system. The minimum working environments of this appendix shall govern unless exceptions are specifically delineated in the specification for a particular component or assembly. See Table A-I.

20. APPLICABLE DOCUMENTS.

20.1 Issue of documents. Not applicable.

20.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

S1.4-1972 Specification for Sound Level Meters.

(Application for copies should be addressed to the American Standards Institute, 1430 Broadway, New York, NY 10018.)

30. DEFINITIONS.

30.1 Cleanliness.

Class D - Daily cleanup: Removal of scrap, clean up all spilled oil, etc.

Class C - Prompt cleanup: Scrap, oil, and residue shall not be allowed to accumulate.

Class B - Prompt cleanup: Oil, residue, and spilled chemicals removed immediately. Floors, walls and work areas shall have easily cleaned surfaces. Cleanup of equipment and area shall be accomplished daily.

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TABLE A-I. Minimum working environment standards.

Environment	Cleanliness	Lighting foot candles	Air temperature	Relative humidity	Dust control	Ventilation or exhaust	Noise (dBa)	Habitat
"A": Ordnance and potting assembly	Class B	100	65-95°F	60% max	Class C	See 30.6	80	Class B
"B": Electrical	Class B	100	Level 2	Level 2	Class C	See 30.6	75	Class C
"C": Mechanical assembly								
Tolerance to 0.01	Class D	70	U	U	Class D		90	Class D
Tolerance to 0.001	Class C	100	Level 2	Level 2	Class C	See 30.6	90	Class D
Tolerance to 0.0001	Class B	150	Level 2	Level 2	Class C		80	Class C
"D": Inert chemical assembly	Class B	100	69-95°F	50% max	Class C	See 30.6	90	Class B
"E": Propellant/ explosive mixing and fabrication	Class B	100	65-95°F	55% max	Class C	See 30.6	90	Class A
"F": Detail parts inspection								
Tolerance to 0.01	Class D	100	Level 1	Level 1	Class D		90	Class D
Tolerance to 0.001	Class C	100	Level 2	Level 2	Class C	See 30.6	80	Class D
Tolerance to 0.0001	Class B	150	Level 2	Level 2	Class C		80	Class C

U = Uncontrolled

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30.2 Lighting. Indicated values are minimum light intensity values at the work station. Supplemental lighting shall be used when necessary to improve precision and minimize operator fatigue, but brightness ratios within the operators field of view shall not exceed 10 to 1.

30.3 Air temperature. Designated absolute temperature limits shown in Figure A-1 are the daily average temperature measurements taken in proximity of the work stations.

30.4 Relative humidity. Designated absolute relative humidity shown in Figure A-1 shall be as measured at room ambient temperature. "U" indicates uncontrolled relative humidity.

30.5 Dust control.

Class D - No dust control required.

Class C - Outside air shall be filtered to remove dust particles. Type of filter is unspecified.

30.6 Ventilation or exhaust. Air velocity at the work station shall be maintained at a velocity of less than 90 feet per minute (ft/min) (0.46 ms) regardless of the season. Additionally, forced ventilation or exhaust shall be provided in areas where operations such as parts cleaning, vapor degreasing, and machine soldering are being accomplished. The maximum air velocity requirement shall not apply in these areas. Work areas for mechanical assembly of tolerances finer than 0.0001 inch (2.54 micrometers) which utilize laminar flow benches shall maintain an air velocity of less than 110 ft/min (0.56 ms).

30.7 Noise. Noise is defined as the average sound level existing at the work station during normal operation when measured with a standard sound-level meter as specified in S1.4-1972 "A" weighted. Work stations for control of automatic equipment operations, which require operator loading and unloading only, may exceed the noise limits specified by 10 decibels adjusted (dBa) but not exceed 90 dBa. Inspection and test work stations shall not exceed the values specified. Work areas for mechanical assembly of tolerances finer than 0.0001 which utilize laminar flow benches may exceed by 4 dBa the value specified.

30.8 Habitat.

Class D - Uncontrolled.

Class C - No food, drink, or personal grooming material is allowed at these work stations. No eating, drinking, or personal grooming is allowed in the work area. Drinking fountains are permissible.

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Class B - No food, drink, personal grooming material, or smoking is allowed at these work stations. No eating, drinking, personal grooming or smoking is allowed in the work area. Drinking fountains are permissible.

Class A - No food, drink, personal grooming material, or smoking material is allowed in these work areas. Drinking fountains are permissible.

30.9 Inspection areas/stations. An inspection area may be adjacent to, or removed from, the area in which the actual work is being done, such as a receiving inspection area. Inspection must be accomplished in working environment at least equivalent to that in which the item to be inspected was fabricated, or is planned to be assembled, or processed.

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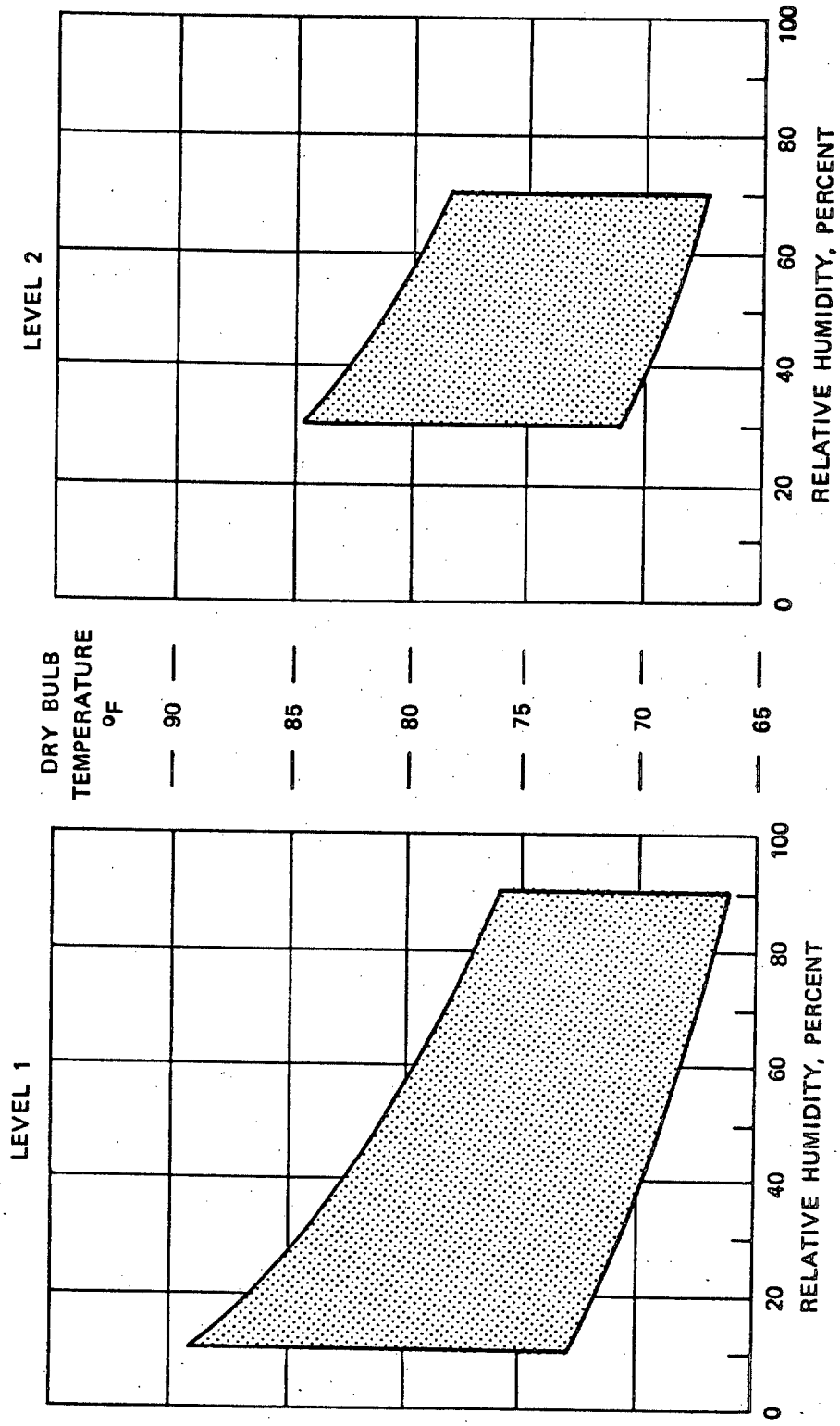

FIGURE A-1. Designated absolute temperature limits.

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