

**MIL-R-81965A(AS)**

7 September 1976

Superseding

MIL-R-81965(AS)

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MILITARY SPECIFICATION

## **RACK, BOMB, AIRCRAFT; BRU-14 AND BRU-15 SERIES**

**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 AND CLASSIFICATION**

**1.1 Scope.** This specification covers two types of bomb racks capable of carrying and releasing stores having suspension lugs spaced 14 inches (35.56 centimeters) apart and weighing up to 2,200 pounds (997.90 kilograms). The test limits in this specification define minimum acceptable capabilities.

**1.2 Classification.** Bomb racks covered by this specification shall be of the following types:

Type I      BRU-14/A Bomb Rack

Type II     BRU-15/A Bomb Rack

### **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-T-7743      Testing, Store Suspension and Release Equipment;  
General Specification for

MIL-H-85042    Hooks, Bomb Rack, General Specification for

**FSC-1095**

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## STANDARDS

MIL-STD-100	Engineering Drawing Practices
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-143	Specifications and Standards, Order of Precedence for the Selection of
MIL-STD-461	Electromagnetic Interference Characteristics Requirements for Equipment
MIL-STD-462	Military Standard, Electromagnetic Interference Characteristics, Measurement of
MIL-STD-704	Electric Power. Aircraft, Characteristics and Utilization of
MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-831	Test Reports, Preparation of
MS3314	Lug. Suspension. 1,000 lb. (453.6Kg.) class, Airborne Equipment

## DRAWINGS

Naval Air Systems Command

DL909AS100	Data List, Test Fixture, BRU-12, 14, 15 and AERO IA Adapter
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(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be reobtained from the procuring activity or as directed by the contracting officer.)

**2.2 Order of precedence of specifications and standards.** Should a conflict exist between any requirement in this specification and any requirement in the applicable documents referenced herein, the requirements of this specification shall take precedence over the referenced (applicable) document.

**3. REQUIREMENTS**

**3.1 First article.** The bomb racks furnished under this specification shall be a product which has been inspected and passed the first article inspection specified herein (see 4.3).

**3.2 Selection of specifications and standards.** Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

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**3.3 Interchangeability.** All parts having the same part number shall be directly and completely interchangeable with each other with respect to installation and performance.

**3.4 Identification of parts.** All parts shall be marked as specified on the drawings listed in the data list for the bomb rack being procured, or in accordance with MIL-STD-130, if not specified on the drawings. The item identification and part number requirements of MIL-STD-100 shall govern the part number and changes thereto.

**3.5 Bomb rack.**

**3.5.1 Construction.** The construction of the bomb rack shall be in accordance with the drawings listed in the data list for the bomb rack being procured and as specified herein (see 6.2. 1g).

**3.5.2 Performance.** The bomb racks shall satisfy all performance requirements when subjected to the following inspections in the order specified in Tables I and II.

- a. Electromechanical Component Inspection (4.6.1)
- b. Bomb Rack Inspection (4.6.2)
- c. Functional Test (4.6.3)
- d. Arming Mechanism (4.6.4)
- e. Electromagnetic Compatibility (4.6.5)
- f. Secondary Systems (4.6.6)
- g. Manual Operation (4.6.7a)
- h. Electrical Characteristics (4.6.7b)
- i. Lag Determination (4.6.7c)
- j. High-g Release (4.6.7d)
- k. Sand (4.6.7e)
- l. Salt Spray (4.6.7f)
- m. Shock Test (4.6.7g)
- n. Vibration Test (4.6.7h)
- o. Life Test (4.6.7i)
- p. Static Test (4.6.7j)
- q. Lock Shut Firing (Type I only) (4.6.8)

**3.6 Bomb rack hooks.** The construction and inspection of the bomb rack hooks shall be in accordance with MIL-H-85042.

**3.7 Workmanship.** The workmanship displayed in fabrication and assembly of the bomb racks shall be such as to assure, within design limitations, the ability of the bomb racks to meet their performance requirements under all applicable environmental conditions specified herein. Unauthorized repair, welding, heavy burrs, or parts assembled by introduction of high stresses not prescribed in the drawings, are typical signs of inferior workmanship and shall be cause for rejection. The standards of

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workmanship exhibited in the approved first article sample, subject to any qualification stated in the government's notice of approval, shall be determinative of the requirements of the contract relative to workmanship.

### 4. QUALITY ASSURANCE PROVISIONS (See 6.4)

**4.1 Responsibility for inspection.** Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 that the supplies and services conform to prescribed requirements.

**4.2 Classification of inspection.** The inspection of the bomb racks shall be classified as follows:

- a. First article inspection (see 4.3)
- b. Quality conformance inspection (see 4.4)

**4.3 First article inspection.** First article inspection shall consist of all of the inspections listed in Table I. First article inspection report format shall be in accordance with MIL-STD-831 (see 6.3).

**4.3.1 Sampling for first article inspection.** First article bomb rack samples shall consist of the first two bomb racks manufactured on contract. The bomb racks shall be permanently labeled A and B for case of identification, Failure of the bomb racks to pass any of the first article inspections shall be cause for rejection (see 6.3).

**4.4 Quality conformance inspection.** Quality conformance inspection shall consist of the following inspections:

- a. Individual Inspections (see 4.4.1)
- b. Sampling Inspections (see 4.4.2)

Quality conformance inspection report format shall be in accordance with MIL-STD-831 (see 6.3).

**4.4.1 Individual inspections.** Individual inspections are those inspections conducted on each bomb rack. Individual inspections for the bomb racks are shown in Table II, Group 1. Failure to pass any of these inspections shall be cause for rejection of the bomb rack.

**4.4.2 Sampling inspections.** A random sampling of the bomb racks shall be selected by the procuring activity from each production lot in accordance with Table III and shall be subjected to the inspections listed in Table II. Group I and Group 2. Group 1 inspections shall be conducted prior to Group 2 inspections. Failure to pass any of these inspections shall be cause for rejection of the entire lot (see 6.2.1f and 6.3).

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TABLE I

## FIRST ARTICLE INSPECTIONS - SCHEDULE AND SEQUENCE

SPARE UNITS REQUIRED PER RACK TESTED <sup>1</sup>		TESTS	TEST PARAGRAPH	SAMPLE	
AUXILIARY UNLOCK	SECONDARY RELEASE			A	B
-	-	Electromechanical Component Inspection	4.6.1	<sup>2</sup>	
-	-	Bomb Rack Inspection	4.6.2	1	1
-	-	Functional	4.6.3	2	2
-	-	Arming Mechanism	4.6.4	3	3
-	-	Manual Operation	4.6.7a	4	X
-	-	Electromagnetic Compatibility	4.6.5	X	4
-	-	Electrical Characteristics	4.6.7b	X	5
6	3	Secondary Systems	4.6.6	5	X
-	-	Lag Determination	4.6.7c	6	X
-	3	High-g Release	4.6.7d	X	6
-	-	Sand	4.6.7e	7	X
1	1	Salt Spray	4.6.7f	8	X
-	-	Shock	4.6.7g	X	7
-	-	Vibration	4.6.7h	X	8
-	-	Life	4.6.7i	9	X
-	-	Static	4.6.7j	X	9
-	-	Lock Shut Firing	4.6.8	10	X

<sup>1</sup> Inspection sequence is denoted by the numbers in the sample columns. An X denotes inspection not required.

<sup>2</sup> Spare units are applicable to Type I bomb racks only. See 6.2.1f.

<sup>3</sup> This requirement is applicable to all bomb rack inspections with the exception of arming mechanism and manual operation.

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TABLE II

## QUALITY CONFORMANCE INSPECTIONS - SCHEDULE AND SEQUENCE

SPARE UNITS REQUIRED PER RACK TESTED <sup>1</sup>		TESTS	TEST PARAGRAPH	SAMPLE			
AUXILIARY UNLOCK	SECONDARY RELEASE			ALL SAMPLES			
		<u>GROUP 1</u>					
-	-	Electromechanical Component Inspection	4.6.1	<sup>1</sup>			
-	-	Bomb Rack Inspection	4.6.2	1			
-	-	Functional	4.6.3	2			
-	-	Arming Mechanism	4.6.4	3			
		<u>GROUP 2</u>		A	B	C	D
-	-	Manual Operation	4.6.7a	1	X	1	X
-	-	Electromagnetic Compatibility	4.6.5	X	1	X	1
-	-	Electrical Characteristics	4.6.7b	X	2	X	2
6	3	Secondary Systems	4.6.6	2	X	X	X
-	-	Lag Determination	4.6.7c	3	X	X	X
-	3	High-g Release	4.6.7d	X	3	X	3
-	-	Sand	4.6.7e	4	X	X	X
1	1	Salt Spray	4.6.7f	5	X	2	X
-	-	Shock	4.6.7g	X	4	X	X
-	-	Vibration	4.6.7h	X	5	X	X
-	-	Life	4.6.7i	6	X	3	X
-	-	Static	4.6.7j	X	6	X	4
-	-	Lock Shut Firing (Type I Racks only)	4.6.8	7	X	X	X

<sup>1</sup> Inspection sequence is denoted by the numbers in the sample columns. An X denotes inspection not required.

<sup>2</sup> Spare units are applicable to Type I bomb racks only. See 6.2.1f.

<sup>3</sup> This requirement is applicable to all bomb rack inspections with the exception of arming mechanisms and manual operation.

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**TABLE III**  
**SAMPLING TEST ITEMS**

ITEM	PRODUCTION LOT SIZE	NUMBER OF SAMPLES
Bomb Racks	100 or Less	2
	101-200	3
	201-300	4
	301 or More	5

The procuring activity shall specify the number of samples, and the sequence of inspections each unit shall be subjected to for lots in excess of 300 units (see 6.2.1e).

**4.5 Inspection conditions.** Unless otherwise specified, all inspections shall be performed under the following conditions:

- a. Room temperature. Room ambient of  $25 \pm 10^{\circ}\text{C}$  ( $77 \pm 18^{\circ}\text{F}$ ) indicated.
- b. Test temperature. All parts of the test item shall be stabilized at the specified temperature  $\pm 2.8^{\circ}\text{C}$  ( $\pm 5^{\circ}\text{F}$ ) indicated prior to conducting any tests. Unless otherwise specified, temperature stabilization will have been attained when the indicated temperature of the surface of the largest mass of the test item does not change by more than  $\pm 2.8^{\circ}\text{C}$  ( $\pm 5^{\circ}\text{F}$ ) in a period of 1 hour.
- c. Test fixture. Whenever tests require that a store be mounted to a bomb rack, a fixture shall be utilized which is in accordance with DL909AS100. All sway brace adjustments shall be in accordance with this data list. This configuration is for test purposes only,
- d. Test stores. Unless otherwise specified in the applicable paragraph, the lightest store shall be 101 pounds (45.8 1 kilograms) and the heaviest store shall be 2,200 pounds (997.90 kilograms). The stores shall conform to the following parameters. All store suspension lugs shall be in accordance with MS3314 and shall be spaced 14 inches (35.56 centimeters) apart. The 101 pound (45.8 1 kilogram) store shall have a center of gravity located midway between the suspension lugs and 5 1/2 inches (13.97 centimeters) below the hook bearing surface of each suspension lug. The other stores shall have centers of gravity located midway between the suspension lugs and 8 inches (20.32 centimeters) below the hook bearing surface of each suspension lug.
- e. Input power requirements. The bomb rack shall perform satisfactorily under all applicable conditions specified herein from a 28 VDC rated voltage power source with characteristics and limits as defined in MIL-STD-704, except that the bomb rack shall operate over a range of 20 to 30 VDC, measured at the bomb rack's input connector(s).

**MIL-R-81965A(AS)****4.6 Inspection methods,**

**4.6.1 Electromechanical component inspection.** The following inspections shall be made during (when applicable) and after each of the inspections conducted on the bomb rack, as specified in Tables I and II, with the exception of 4.6.4 and 4.6.7a.

**4.6.1.1 Type I and Type II bomb racks.** Proper operation of the cocked indicator and transfer switches of the Actuator, Linear, Electromechanical, hereinafter referred to as the LEMA, shall be verified in accordance with 4.6.3. Id or 4.6.3.2d. The voltage shall be as specified in the applicable inspection.

**4.6.1.2 Type I bomb racks only.**

- a. The actuator assembly (In Flight Operable Bomb Rack Lock), hereinafter referred to as the IFOBRL, shall be electrically locked after cocking the linkage assembly of the bomb rack, unless otherwise specified herein. Unless otherwise specified, the I FOBRL shall be electrically unlocked just prior to each release of the linkage assembly, with or without a store suspended from the bomb rack. The IFOBRL shall complete full travel (lock-to-unlock or unlock-to-lock) in 2.2 to 4.5 seconds when operated electrically (20-30 VDC). This requirement is applicable to all environmental conditions specified herein. Proper operation of electrical and mechanical position indicators of the IFOBRL shall be verified for each cycle.
- b. Proper operation of the auxiliary unlock assembly indicator switch, which indicates actuation of auxiliary unlock assembly, shall be verified.

**4.6.2 Bomb rack inspection.** The bomb rack shall be inspected as follows:

**4.6.2.1 Individual inspections.** Each bomb rack shall be inspected to ensure that it has been properly assembled and adjusted, that the electrical connections are secure and that the workmanship is as specified herein (see 3.7).

**4.6.2.2 First article and quality conformance inspections.**

- a. Each bomb rack shall be thoroughly examined to determine conformance to all of the requirements specified herein (see 3.5.1).
- b. The bomb racks shall be examined to ascertain that the packaging conforms to the contract requirements (see 5).

**4.6.3 Functional test.** Type I and Type II bomb racks.

**4.6.3.1 Type I bomb racks.** The following test shall be performed on each Type I bomb rack in the sequence listed.

- a. With the bomb rack unloaded and the IFOBRL unlocked, cock the LEMA and linkage assembly and latch the hooks. Verify that there is free play between the bell crank and the LEMA. Verify that the linkage assembly is properly cocked and the hooks securely latched.
- b. Manually turn the IFOBRL knob until the IFOBRL is locked. The IFOBRL shall operate smoothly.



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- c. Manually attempt to move the bell crank forward. The linkage assembly and hooks shall remain securely cocked and latched.
- d. Apply rated voltage to the LEMA. The LEMA shall uncock but its cocked indicator switch shall remain closed. Remove the rated voltage. The cocked indicator switch shall open. No current shall flow through the transfer switch until re-application of the rated voltage. The linkage assembly and hooks shall remain securely cocked and latched.
- e. Cock the LEMA.
- f. Manually turn the IFOBRL knob until the IFOBRL is unlocked. The IFOBRL shall operate smoothly.
- g. Manually move the bell crank forward to release. Both hooks shall fully open.
- h. Repeat a. through e., but operate the IFOBRL at rated voltage. In addition to the requirements of a. through e., the lockbar shall not contact the sear link or secondary release assembly when locked or unlocked.
- i. Electrically unlock the IFOBRL.
- j. Apply rated voltage to the LEMA. Both hooks shall fully open. The LEMA shall function as in d.
- k. Recock the LEMA and linkage assembly. The hooks shall remain open. Ensure that there is free play between the bell crank and the LEMA and that the linkage assembly is properly cocked.
- l. Electrically lock the IFOBRL using rated voltage.
- m. Latch a 2,200 pound (997.90 kilogram) store to the bomb rack, latching the hooks securely. The store and swaybrace loads (4,200 pounds, 1,905.12 kilograms total vertical down load, midway between the hooks) may be simulated using hydraulic rams, or similar methods, if approved by the procuring activity.
- n. Electrically unlock the IFOBRL using rated voltage.
- o. Release the load by applying rated voltage to the LEMA. The LEMA shall function as in d.
- p. Repeat l. through o., with the IFOBRL operated manually.

**4.0.3.2 Type II bomb racks.** The following test shall be performed on each Type II bomb rack in the sequence listed.

- a. With the bomb rack unloaded, cock the LEMA and linkage assembly and latch the hooks. Verify that there is free play between the bell crank and LEMA and that the linkage assembly is properly cocked and the hooks securely latched.
- b. Insert the latch check pin assembly, hereinafter referred to as the safety pin, in the safety pin hole.

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- c. Attempt to release the bomb rack manually by pulling the manual release cable assembly vertically upward with a force not to exceed 50 pounds (22.68 kilograms). The linkage assembly and hooks shall remain securely cocked and latched.
- d. Apply rated voltage to the LEMA. The LEMA shall uncock but its cocked indicator switch shall remain closed. Remove the rated voltage. The cocked indicator switch shall open. No current shall flow through the transfer switch until re-application of rated voltage. The linkage assembly and hooks shall remain securely cocked and latched.
- e. Cock the LEMA.
- f. Remove the safety pin from the safety pin hole.
- g. Pull the manual release cable assembly vertically upward. The travel distance necessary to release the bomb rack shall not exceed 15/ 16 inch (2.38 centimeters).
- h. Repeat a.
- i. Apply rated voltage to the LEMA. Both hooks shall open fully. The LEMA shall function as in d.
- j. Cock the LEMA and linkage assembly. The hooks shall remain open. Verify that there is free play between the bell crank and LEMA and that the linkage assembly is properly cocked.
- k. Insert the safety pin in the safety pin hole.
- l. Latch a 2,200 pound (997.90 kilogram) store to the bomb rack, latching the hooks securely. The store and swaybrace loads (4,200 pounds, 1905.12 kilograms total vertically downward load, midway between the hooks) may be simulated using hydraulic rams, or similar methods, if approved by the procuring activity.
- m. Remove the safety pin and release the load by applying rated voltage to the LEMA. The LEMA shall function as in d.
- n. Repeat j. through m.

**4.0.4 Arming mechanism.** A MK-9 or MK-11 bomb arming wire assembly shall be inserted in the tail and nose arming units of the bomb rack. With each arming unit unenergized, pull each arming wire slowly, in a vertically downward direction, parallel to the side of the bomb rack. Each arming unit shall support a 9 pound (4.08 kilogram) load, but release the wire at any load in excess of 13 pounds (5.89 kilograms). A minimum of three successive measurements shall be obtained on each unenergized arming unit. With each arming unit energized, pull on each arming wire in the same direction as specified above. Each arming unit shall support a load of 150 pounds (68.04 kilograms).

**4.6.6 Electromagnetic compatibility.** The bomb rack (excluding the LEMA) shall be tested to MIL-STD-461. Class ID using the methods described in MIL-STD-462. The following tests are applicable: CE01, CE02, CE03, CE04, RE02, CS01, CS02, CS06, RS01, RS02, and RS03. The following shall apply:

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- a. Conducted and radiated emission levels emitted by the bomb rack shall not exceed those values depicted in Figures 1 through 3.
- b. The power line configuration during conducted emission testing shall include a 7 microhenry choke in series with each power lead.
- c. The In Flight Operable Bomb Rack Lock (IFOBRL) shall be loaded with a 0.030 ampere suppressed inductive load across pins E and D in series with a 28 VDC power source. Pins G and F shall be loaded by a 0.010 ampere resistive load in series with a 28 VDC power source.
- d. The mechanical loading configuration of the bomb rack during test shall be NO LOAD.
- e. In addition to the requirements specified in MIL-STD461, the bomb rack shall meet the following requirements:
  1. The bomb rack shall not emit radiated magnetic fields exceeding Figure 4 of this document, when tested in accordance with test method RE01 of MIL-STD-462.
  2. The bomb rack shall operate without degradation when subjected to a near-linear steady-state magnetic field of 1 oersted.
  3. Static magnetic fields. The bomb rack shall not generate a static magnetic field intensity (H), due to DC, exceeding  $1.2 \times 10^{-1}$  oersteds, at a point 12.0 inches (30.48 centimeters) from the center of the bomb rack magnetic sources. A static magnetic field is defined as a field which does not change in magnitude or direction during flight.
  4. Dynamic magnetic fields. The bomb rack shall not generate a dynamic magnetic field intensity (H) over the frequency range from DC to 30Hz exceeding  $7.2 \times 10^{-3}$  oersteds. The measurement distance shall be 12.0 inches (30.48 centimeters) from the center of the bomb rack magnetic sources.

**4.6.6 Secondary systems. Type I bomb racks only.** This test shall be performed at the following test temperatures:

- a. Room Temperature
- b.  $-56.7^{\circ}\text{C}(-70^{\circ}\text{F})$
- c.  $+70^{\circ}\text{C}(+158^{\circ}\text{F})$

Perform the room temperature test first. The secondary release assembly and auxiliary unlock assembly shall be replaced with spare units after each use. Each test shall be conducted as indicated below.

- a. With the bomb rack at room temperature and the IFOBRL unlocked, cock the LEMA and linkage assembly, leaving the hooks open. Electrically lock the IFOBRL using rated voltage. Attach a 101 pound (45.81 kilogram) store to the bomb rack, latching the hooks. Verify that all is properly cocked, latched and locked. Insert a M55 Ignition Element in the auxiliary unlock assembly and a MK-17 Mod 0 Ignition Element in the secondary release assembly.

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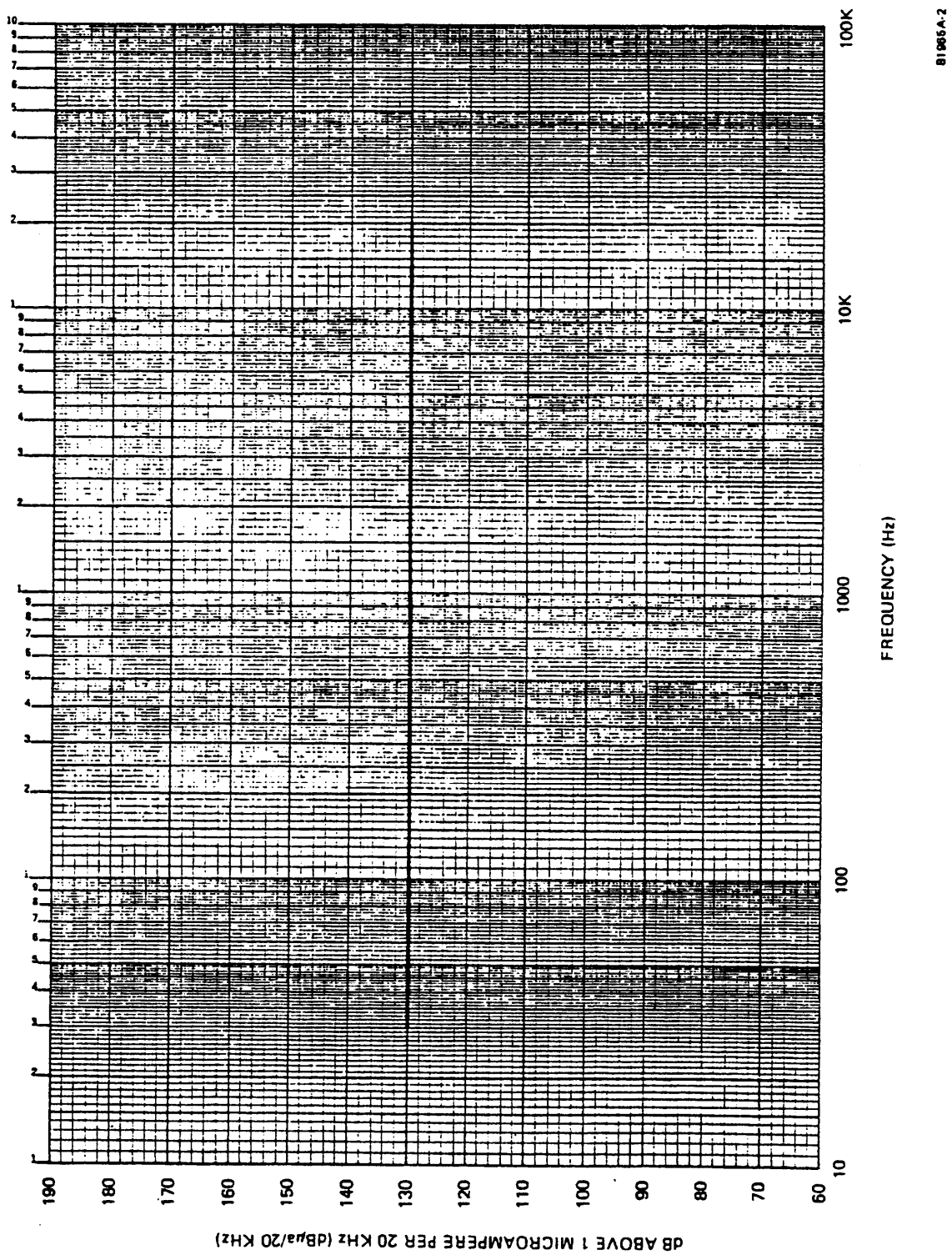
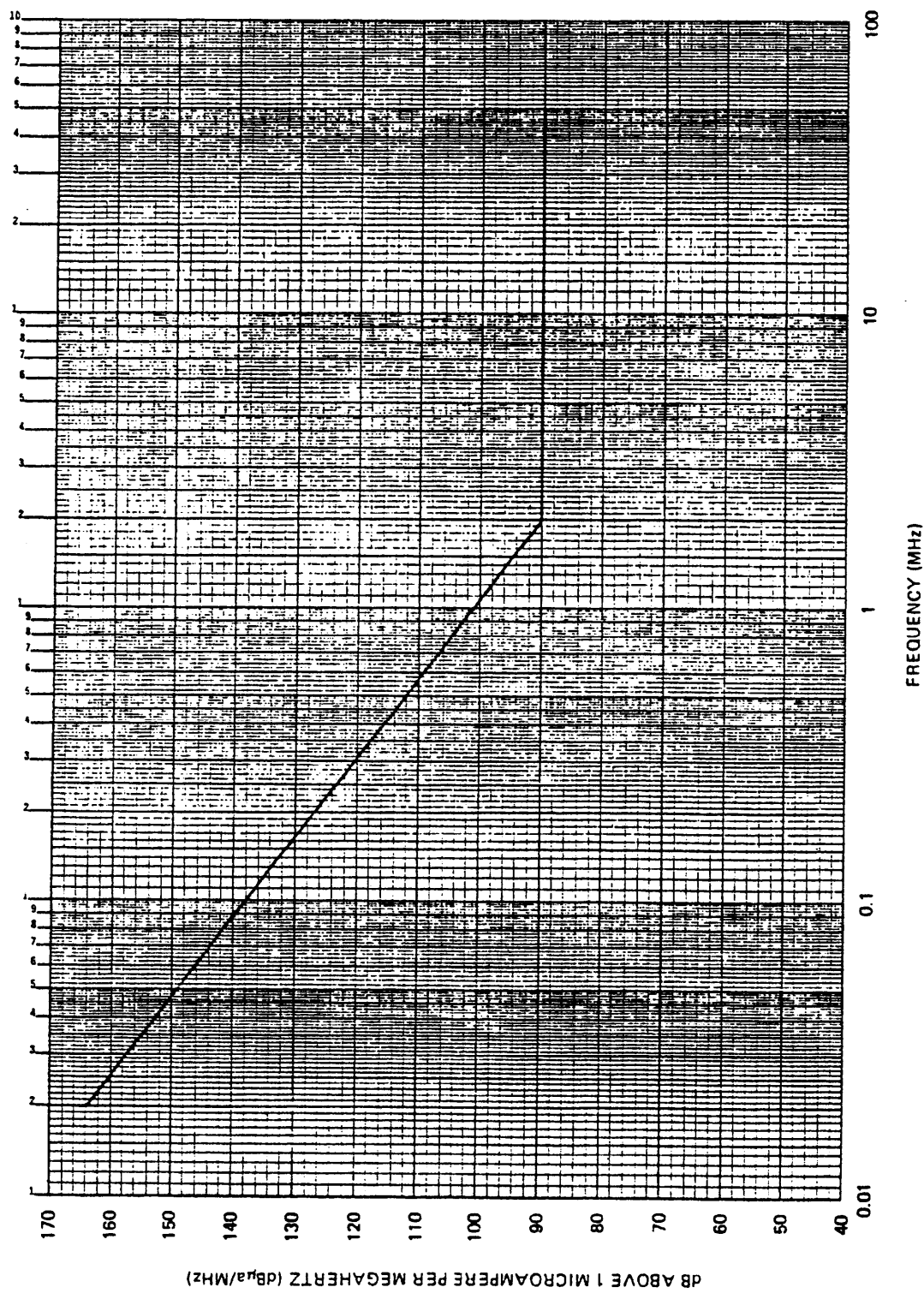


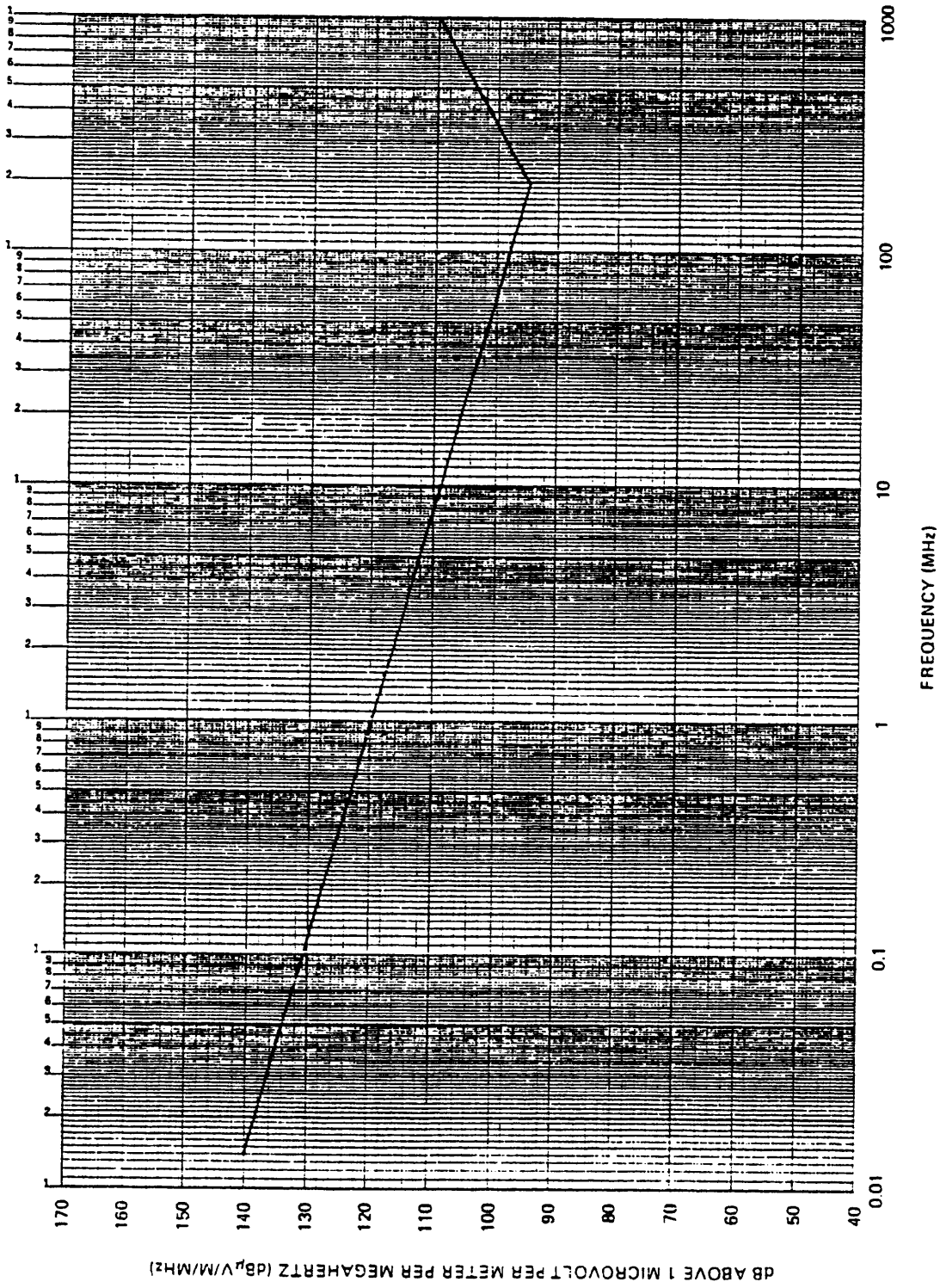
Figure 1. Specification Limit for CE01 and CE02 Broadband Emissions

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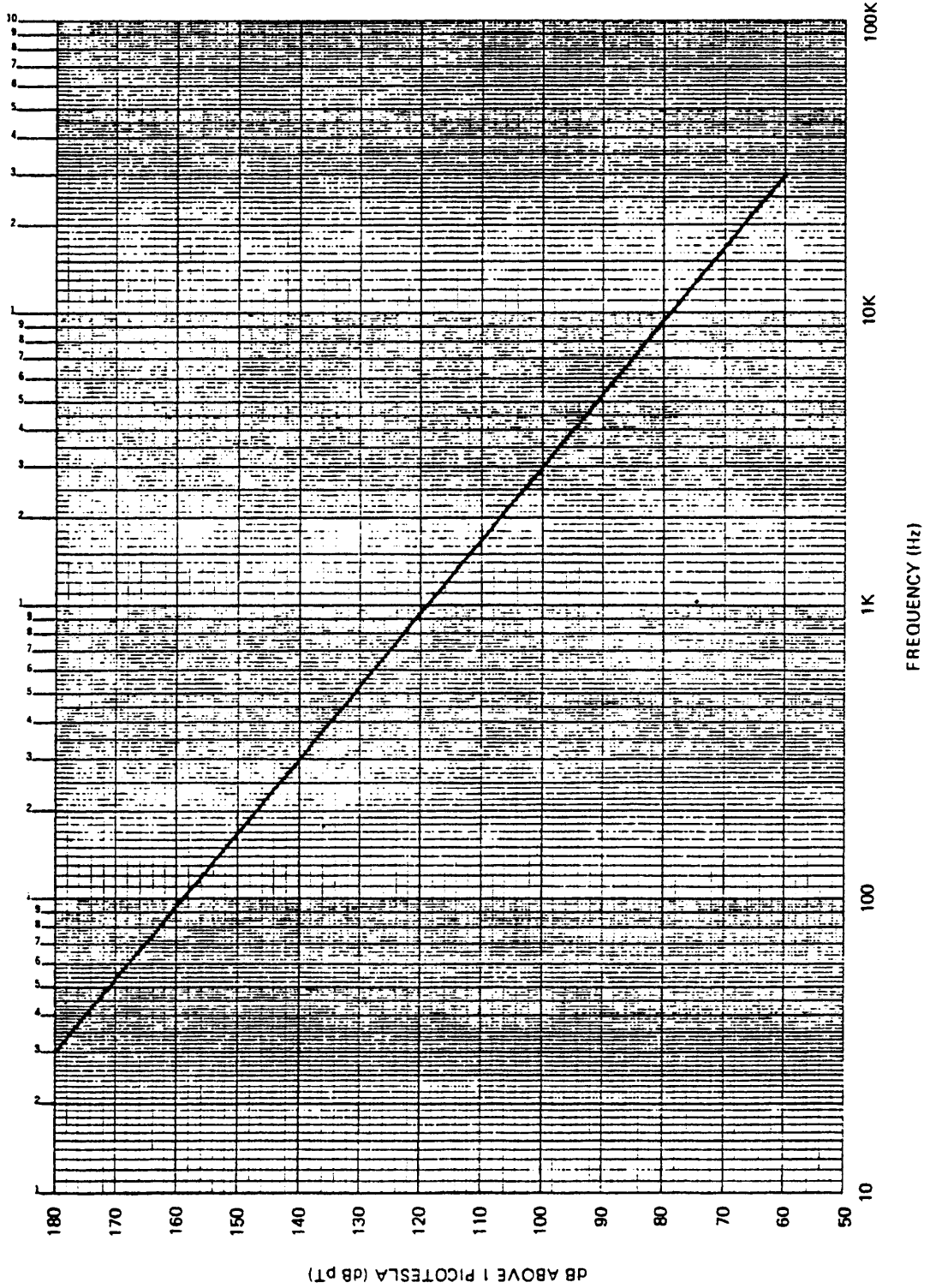
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Figure 3. Specification Limit for RE02 Broadband Emissions



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Figure 4. Specification Limit for RE01 Magnetic Field Emissions

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- b. Stabilize the bomb rack at the test temperature.
- c. Ignite the M55 ignition Element with rated voltage. The IFOBRL shall be freed and the auxiliary unlock assembly indicator switch shall close.
- d. Release the store by applying rated voltage to the LEMA. Measure the lag time, which must be no greater than 100 milliseconds. The bomb rack shall be visually inspected for damage. Only damage of the auxiliary unlock assembly is acceptable. Allow the bomb rack to return to room temperature and any condensation to evaporate completely. Replace the auxiliary unlock assembly.
- e. Repeat a.
- f. Repeat b. and c.
- g. Release the store by applying rated voltage to the MK-17 Mod O Ignition Element. Measure the lag time, which shall be no greater than 100 milliseconds. The bomb rack shall be visually inspected for damage. Damage of the auxiliary unlock assembly and secondary release assembly only is permitted. Allow the bomb rack to return to room temperature and any condensation to evaporate completely. Replace the auxiliary unlock assembly and secondary release assembly.

**4.6.7 Additional tests.** The bomb rack shall pass the following tests of MIL-T-7743 as specified, except as modified herein. The arming units shall meet the requirements of 4.6.4 when they are required to be tested, and they shall be tested in the vertically downward direction only.

- a. Manual Operation (see 4.6.7.1)
- b. Electrical Characteristics (see 4.6.7.2)
- c. Lag Determination (see 4.6.7.3)
- d. High-g Release (see 4.6.7.4)
- e. Sand Test (see 4.6.7.5)
- f. Salt Spray (see 4.6.7.6)
- g. Shock Test (see 4.6.7.7)
- h. Vibration Test (see 4.6.7.8)
- i. Life Test (see 4.6.7.9)
- j. Static Test (see 4.6.7.10)

**4.6.7.1 Manual operation, Type II bomb racks.** A Type II bomb rack shall be subjected to the following portions of the manual operation test.

- a. Travel distances test: release mechanism release point measurement.



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- b. Operating forces, release mechanism test; horizontal release check, dive and climb, HBB items check.

Manual releases of a Type II bomb rack shall be accomplished by pulling the manual release cable assembly. Release forces and travel distances shall be measured when pulling the manual release cable assembly in the vertically upward direction. A minimum of three measurements shall be performed. The release forces shall be recorded. The travel distance necessary to effect release shall be no greater than 15/16 inch (2.38 centimeters).

**4.6.7.2 Electrical characteristics.** This test shall be conducted with the following exceptions:

- a. The class of insulation shall be considered class A for temperature rise tests of the electromagnetic units.
- b. The test temperature shall be 93.3°C (200° F) when conducting the insulation resistance test.
- c. The minimum operating voltage shall be determined by demonstrating that all electrical equipment on the bomb rack operates when 20 VDC is applied to the terminals of the applicable bomb rack connectors.

**4.6.7.3 Lag determination.** This test shall be conducted in accordance with the lag or time of release determination test for horizontal bombing (HB) items, except that the mean deviation requirement for lag times shall not apply. When testing a Type I bomb rack, the IFOBRL shall be operated using 20 VDC sustained whenever a 20 VDC, 20-millisecond pulse is required to effect a store release. A 101 pound (45.81 kilogram) store shall be used for lightest store releases and a 2,200 pound (997.90 kilogram) store shall be used for heaviest store releases.

**4.6.7.4 High-g release.** This test shall be conducted, except that the total vertical down load shall be 7,975 pounds (3,617.46 kilograms). When testing a Type I bomb rack, the secondary release assembly shall be replaced after each use.

**4.6.7.5 Sand test.** This test shall be conducted in accordance with the dry sand and room temperature portions of the sand test with the following exceptions:

- a. Type I and Type 11 bomb racks.
  - 1. The force required to arm test shall not apply.
  - 2. The arming wire pulls, safe setting, shall not apply.
- b. Type I bomb racks only.
  - 1. The IFOBRL shall be locked prior to the dry sand exposure period.
  - 2. The IFOBRL shall be operated using 20 VDC sustained whenever a 20 VDC, 20 millisecond pulse is required to effect a store release.

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**4.6.7.6 Salt spray.** This test shall be conducted in accordance with the salt spray test except and with the following changes:

Type I and Type II bomb racks.

1. The primary release test shall be conducted utilizing the LEMA.
  2. The arm test shall be conducted utilizing a pull force of 150 pounds (68.04 kilograms).
  3. The minimum voltage test shall be as defined in 4.6.7.2c.
- b. Type I bomb racks only.
1. The IFOBRL shall be locked prior to the salt spray exposure period.
  2. The IFOBRL shall be electrically unlocked using 20 VDC sustained just prior to the release of the primary release test.
  3. The auxiliary release test shall be conducted utilizing the auxiliary unlock assembly and secondary release assembly (see e. through g. of 4.6.6). The auxiliary unlock assembly and secondary release assembly shall be replaced with spare units after completion of the salt spray test.
- c. Type II bomb racks only.
1. The store shall be released by pulling vertically upward on the manual release cable assembly during the auxiliary release test.

**4.6.7.7 Shock test.** This test shall be conducted in accordance with the shock test, with the following changes:

- a. When testing a Type I bomb rack, the IFOBRL shall have been locked prior to each applied shock.
- b. The bomb rack shall be unlocked and released via the IFOBRL and LEMA, at rated voltage, after each shock applied with the bomb rack loaded.
- c. Light load tests shall be conducted using a 101 pound (45.81 kilogram) store as indicated in Table IV.
- d. Yield load shock tests shall be conducted with a 1,000 pound (453.6 kilogram) store. Applied shock amplitudes for the yield load shall be based on the limit shock loads given in Table IV. Yield shock loads are 1.15 times the values shown in Table IV.
- e. The ultimate load shock test shall not be conducted.

**4.6.7.8 Vibration.** This test shall be conducted in accordance with the vibration test with the following changes:

- a. The input amplitude of vibration shall be 0.020 inch (0.0508 centimeter) D.A. or  $\pm 2.6$  g's, whichever is less for test store weight of 1,000 pounds (453.6 kilograms).

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- b. Store releases shall be accomplished through use of the LEMA.
- c. The following shall apply for Type I bomb racks only. For all unloaded tests the IFOBRL shall be unlocked prior to vibration. For all loaded tests the IFOBRL shall be locked prior to vibration. For releases performed while vibrating at resonance, the IFOBRL shall be electrically unlocked at rated voltage while vibrating, just prior to release. For all releases after vibration, the IFOBRL shall be unlocked at rated voltage after vibration has been stopped, just prior to release.

TABLE IV  
APPLIED SHOCK LOADS

DIRECTION	APPLIED SHOCK LIGHT LOAD g's) FOR 101 LB, (45.81 KG.) STORE	APPLIED SHOCK LIMIT LOAD (g's) FOR 1,000 LB. (453.6 KG.) STORE
Vertical Down	25	7.33
Vertical Up	25	3.67
Longitudinal Forward	25	6.60
Longitudinal Aft	25	6.60
Transverse Port	25	4.80
Transverse Starboard	25	4.80

**4.6.7.9 Life test.** This test shall be conducted in accordance with the life test for nonexplosive items, except that the mean deviation requirement shall not apply. For Type I bomb racks the IFOBRL shall be cycled (lock-to-unlock) at rated voltage prior to each release of the bomb rack.

**4.6.7.10 Static load tests.** This test shall be conducted in accordance with the static tests except that the bomb rack shall be loaded to limit, yield and ultimate loads. The failure load test shall not be conducted. Yield loads shall be 1.15 times and ultimate loads 1.5 times the limit loads given in Table V. The loads shall be applied to a rigid simulated store of negligible weight (200 pounds, 90.72 kilograms maximum). All loads and moments shall act at a point midway between the hooks and 8 inches (20.32 centimeters) below the lug bearing surfaces. When testing a Type I bomb rack, the IFOBRL shall be locked prior to application of loads. After reaching the specified limit, yield and ultimate loads, the loads applied to the simulated store shall be reduced to zero and the simulated store released utilizing the LEMA and 28 VDC. Bomb rack function shall not be degraded nor shall there be any permanent deformation or damage noticeable by visual examination after return to zero load from limit and yield loads. A modified functional test as outlined in 4.6.3.1a. through j. for Type I bomb racks and 4.6.3.2a. through i. for Type II bomb racks, as applicable, shall be performed after application of limit and yield loads. The bomb rack shall not release the store below or at ultimate load. However, permanent deformation, damage and functional degradation, including failure to release the store, is acceptable after return to zero load from ultimate load.

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TABLE V  
STATIC TEST LIMIT LOADS

Condition	Px Longitudinal	Py Side	Pz Vertical	Myy Pitch Moment	Mzz Yaw Moment
1	+3,530 Lbs. (+1,601.18 Kg.)	+4,320 Lbs. (+1,959.52 Kg.)	-4,970 Lbs. (-2,254.35 Kg.)	-74,200 Inch-Lbs. (-8,383.47 N.m)	+82,500 Inch-Lbs (+9,321.25 N.m)
2	+9,000 Lbs. (+4,082.33 Kg.)	+ 1,500 Lbs. (+680.39 Kg.)	-3,003 Lbs. (-1,360.77 Kg.)	+ 16,800 Inch-Lbs. (+ 1,898.14 N.m)	+5,600 inch-Lbs. (+632.71 N.m)
3	-9,000 Lbs. (-4,082.33 Kg.)	+ 1,500 Lbs. (+680.39 Kg.)	-3,000 Lbs. (-1,360.77 Kg.)	+ 16,800 inch-Lbs. (+ 1,898.14 N.m)	+8,400 inch-Lbs. (+949.07 N.m)
<b>SIGN CONVENTION</b>					
+Px = Longitudinal Aft +PY = Side to Port + Pz = Vertical Up			+Myy = Pitch Nose Up +Mzz = Yaw Nose to Port		

**4.6.8 Lock shut firing, Type I bomb racks only.** The bomb rack shall be loaded with a 2.200 pound (997.90 kilogram) store and the IFOBRL shall be locked. An attempt to release the store shall be made by actuating the secondary release assembly at rated voltage. The bomb rack shall meet the following requirements after the secondary release has fired.

- a. The store shall not release and the bomb rack shall remain cocked and locked.
- b. All electrical position indicators shall still function.
- c. There shall be no damage to any portion of the rack other than to the secondary release unit.
- d. Actuation of the IFOBRL to the unlocked condition shall not cause a release of the store.

**MIL-R-81965A(AS)****6. PACKAGING**

**6.1 Bomb rack preservation and packaging.** Preservation and packaging shall be in accordance with Level A, B or C as specified in MIL-STD-794, as specified in the contract, without the use of preservation compound.

**6.2 Packing.** Shipping containers shall contain one each packaged bomb rack. The container shall be suitable for Level A, B or C as specified in MIL-STD-794.

**6.3 Unitized loading.** Unitized loading for the bomb racks is authorized as specified in MIL-STD-794.

**6.4 Marking.** All shipping containers shall be marked in accordance with the requirements of MIL-STD-129 with the following information:

RACK, BOMB, AIRCRAFT BRU-  
MILITARY SPECIFICATION NO. MIL-R-81965(AS)  
PRESERVED (DATE)  
DOMESTIC OR EXPORT PACKED (AS APPLICABLE)  
GOVERNMENT ORDER NO. (OR CONTRACT NO. IF ORDER NO. IS  
NOT ASSIGNED)  
NAME OF SUPPLIER (AND NAME OF MANUFACTURER IF NOT THE  
SAME)  
MANUFACTURER'S CODE IDENTIFICATION NUMBER

**6. NOTES**

**6.1 Intended use.** The bomb racks covered by this specification are intended for use in level bombing and glide bombing. They are mounted either externally, as in an aircraft wing pylon, or internally, as in a bomb bay. They are intended for use on either land-based or carrier-based aircraft.

**6.2 Ordering data.** Procurement documents shall specify the following:

**6.2.1 Procurement requirements.**

- a. Title, number and date of this specification.
- b. Selection of applicable levels of preservation, packaging and packing required (see 5.1 and 5.2).
- c. Samples subjected to sampling inspection shall not be considered or accepted as part of the contract (see 4.4.2).
- d. Sampling inspection selection (see 4.4.2).
- e. Number of samples and inspection sequence for production lots in excess of 300 units (see Table II).
- f. Number of extra auxiliary unlock and secondary release units as required for testing purposes (see Tables I and III for quantities required).

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- g. Applicable drawing package for type of bomb rack required (see 3.5.1).
- h. Name and location of government representative responsible for random selection of inspection samples (see 4.4.2).
- i. Items of data required (see 6.3).
- j. Name and location of government approved test laboratory.

**6.2.2 Contract provision.** Contracts shall specify the following provision for first article inspection.

**6.2.2.1 First article.** When a first article is required for inspection and approval (see 3.1, 4.3, 6.2 and 6.3), the contract shall specify the following provision for first article inspection. When a contractor is in continuous production of bomb racks from contract to contract, consideration should be given to waive the first article inspections. If inspection is required, indicate:

- a. If first article inspections are conducted at the contractor's plant or a government approved laboratory, an inspection report shall be forwarded to the procuring activity for verification.
- b. That the approval of first article samples or the waiving of the first article inspection shall not relieve the contractor of his obligation to fulfill all other requirements of the specification and contract.

**6.3 Contract data requirements.** When this specification is used in a procurement which incorporates a DD Form 1423 and invokes the provisions of 7-104.9(n) of the Armed Services Procurement Regulations, the data requirements identified below will be developed as specified by an approved Data item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (DD Form 1423) incorporated into the contract. When the provisions of ASPR-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 is cited in the following paragraphs:

Paragraph	Data Requirement	Applicable DID
4.3	First Article Inspection Reports	DI-T-5329 - Inspection Test Reports
4.4	Quality Conformance Inspection Reports	DI-T-5329 - Inspection Test Reports

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

**6.4 Quality assurance definitions.** Definitions for quality assurance terms are in accordance with MIL-STD-109.

Preparing Activity

NAVY-AS

DOD Proj. No. 1095-N086

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL		OMB Approval No. 22-R255
<p><b>INSTRUCTIONS:</b> The purpose of this form is to solicit beneficial comments which will help achieve procurement of suitable products at reasonable cost and minimum delay, or will otherwise enhance use of the document. DoD contractors, government activities, or manufacturers/vendors who are prospective suppliers of the product are invited to submit comments to the government. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements. Attach any pertinent data which may be of use in improving this document. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity.</p>		
DOCUMENT IDENTIFIER AND TITLE		
MIL-R-81965A(AS) RACK, BOMB, AIRCRAFT: BRU-14 and BRU-15 SERIES		
NAME OF ORGANIZATION AND ADDRESS		CONTRACT NUMBER
		MATERIAL PROCURED UNDER A
		<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT
1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?		
A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
2. COMMENTS ON ANY DOCUMENT REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE DOCUMENT RESTRICTIVE?		
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4. REMARKS		
SUBMITTED BY (Printed or typed name and address - Optional)		TELEPHONE NO.
		DATE

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MIL-R-81965A(AS)  
AMENDMENT 1  
1 November 1976

MILITARY SPECIFICATION

RACK, BOMB, AIRCRAFT; BRU-14  
AND BPU-15 SERIES

This amendment forms a part of Military Specification MIL-R-81965A (AS), dated 7 September 1976, and is approved for use by the Naval Air Systems Command, Department of the Navy.

PAGE 18

4.6.7.8a Delete the entire paragraph and substitute: "The vibration test shall be done in accordance with Procedure 1, except that the frequency range shall be 5-2000 hertz. The input amplitude of vibration shall be 0.508 millimeters (0.020 inches) DA or  $\pm 2.6$  g's, whichever is less, for a store weight of 453.6 kilograms (1000 Pounds) 1

PAGE 19

4.6.7.8b Delete this paragraph in its entirety.

4.6.7.8c Delete "c" and substitute "b".

Preparing activity:  
Navy - AS  
DOD Proj. NO 1095-N098

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