

MILITARY SPECIFICATION

DUMMY LOAD, ELECTRICAL, 600 WATTS

D. C. TO 3000 MC.

1. SCOPE

1.1 This specification covers a portable type dummy load in the frequency range d. c. to 3000 mc. which is to be used as a termination on radio transmitter sets and to prevent radiation of energy. This equipment shall be suitable for use as a termination for radio transmitting equipment at ship and shore installations.

2. APPLICABLE DOCUMENTS

2.1 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-S-901 - Shock Tests, H. I. (High Impact); Shipboard Machinery, Equipment and Systems, Requirements for.
- MIL-E-15090 - Enamel, Equipment, Light-Gray (Formula No. 11).
- MIL-E-16400 - Electronic Equipment, Naval Ship and Shore; General Specification.
- MIL-E-17555 - Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of.
- MIL-R-22732 - Reliability Requirements for Shipboard and Ground Electronic Equipment.

STANDARDS

MILITARY

- MS 15507 - Connector, Adapter Tee (Radio Frequency Adapter UG-57B/U).
- MIL-HDBK-216 - R F Transmission Lines and Fittings.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific 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.

OFFICIAL CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules

(Applications for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd St., New York 16, New York).

3. REQUIREMENTS

3.1 Preproduction sample. - Prior to beginning production a sample shall be tested as specified in 4.3.

3.2 Material. - Material shall be in accordance with MIL-E-16400, except as otherwise specified herein. Particular attention shall be paid to the acceptable and unacceptable material requirements of MIL-E-16400.

3.3 General requirements. - The equipment shall be in accordance with the provisions of MIL-E-16400, except as otherwise specified herein. The design objectives, as specified in MIL-E-16400 for reliability, simplicity, ease of installation and maintenance consistent with the needs of the Naval service, shall be considered during all phases of the equipment design.

3.3.1 Temperature and humidity. - The equipment shall be capable of operation under the following conditions as specified in MIL-E-16400:

- (a) Temperature - Class 1.
- (b) Humidity - 95 percent.

3.3.2 Shock. - The equipment shall meet the grade A, class I, type A, shock test for lightweight equipment in accordance with MIL-S-901.

3.3.3 Test points and test features. - Test points and test features are not required.

3.3.4 Time meters. - Elapsed time meters are not required.

3.4 Functional description. - This equipment shall be capable of absorbing a minimum of 600

watts average power when used with a radio transmitter in the frequency range d.c. to 3000 mc. (see 3.5.3). The dummy load shall be provided with radiating fins, and may be provided with a cooling medium oil for heat dispersion. External or internal operating power sources shall not be used.

3.5 Performance requirements. - The equipment shall meet the requirements specified in 3.5.1 through 3.5.6.

3.5.1 Frequency range. - The equipment shall operate in accordance with this specification over the frequency range of d.c. to 3000 mc.

3.5.2 Input impedance. - The dummy load shall be designed for a 50-ohm coaxial input.

3.5.3 Power rating. - The equipment shall be capable of dissipating 600 watts average power continuously over the specified temperature range, and shall be capable of dissipating 900 watts in ambient air (+23° centigrade (C) for a period of one quarter hour, with a sinusoidal voltage applied to the load.

3.5.4 Coolant. - A high temperature non-flammable dielectric coolant such as Monsanto type OS-59 may be used.

3.5.5 Cooling. - The power dissipation unit shall be so arranged that a flame or spark in the vicinity of the equipment will not cause a fire or explosive reaction. Design shall be such as to prevent leakage of cooling medium from the equipment regardless of position, and prevent leakage of water into the unit, thereby contaminating the coolant. No external coolant (except air), cooling system, nor system requiring external accessories shall be used. Cooling employed shall be adequate to prevent peeling, blistering, or discoloring of the enclosure finish.

3.5.6 Voltage standing wave ratio (VSWR). - The VSWR set up by the dummy load, when used as a termination for 50-ohm coaxial line shall not exceed 1.2 to 1 over all frequency and power dissipating ranges.

3.6 Input connections. - An input connector type N, nomenclature UG-57B/U conforming to MS 15507 shall be mounted on the front of the equipment. A cap shall be attached to the equipment by a chain for use in protecting the input connector. R. F. Transmission Lines and Fittings in accordance with MIL-HDBK-216 shall be used insofar as practicable.

3.7 Weight. - The total weight of the equipment shall not exceed 17 pounds.

3.8 Size. - The size of the equipment shall be kept to a minimum consistent with the requirements

of this specification, and shall not exceed 18-1/2 inches long, 6 inches wide, and 8-1/2 inches high.

3.9 Transit and combination case. - Neither a transit case nor a combination type case will be required. All fins shall be of sturdy tough construction with rounded edges.

3.10 Handles. - The equipment shall be designed with a carrying handle and shall have a clearance sufficient to pass a block 1-7/8 by 4-3/8 inches in cross section. The grip portion of the handle shall be of non-metallic material and shaped to fit the hand comfortably. The handle shall be centered to balance the equipment.

3.11 Vent and filler plug. - A vent and oil filler plug shall be provided on the top side of the load. This plug shall be constructed in such a manner so as to prevent leakage of the oil coolant. This plug shall also serve to maintain pressure constant with temperature variations.

3.12 Mounting. - The equipment shall be designed with two flat base flanges on the bottom of the dummy load (one on the front and rear) and shall be capable of permanent mounting.

3.13 Operating position. - This dummy load shall be designed to operate in a normal position, but shall be capable of operating in any position.

3.14 Radio interference. - Radiating r.f. energy from the load shall be a minimum of 60 db below the applied energy as measured with a matched half wave balanced dipole antenna placed so that the antenna is in the position of maximum pick-up with the center of the dipole not more than 3 feet from the load. Measurements shall be taken at 100, 500, 1000, 1500, 2000, 2500, and 3000 mc.

3.15 Painting. - Only the exterior finish of the equipment shall be gray enamel in accordance with type III, class 2 of MIL-E-15090, except that fins may be dull black.

3.16 Rough usage. - The design of the equipment shall be such as to preclude damage to the equipment when handled roughly by relatively unskilled personnel.

3.17 Reliability requirements. -

3.17.1 Reliability. - The following procedure outlines in detail and in simplified form the steps needed to fulfill the general requirements specified in MIL-B-16400 or reliability as it is applicable to this equipment.

3.17.2 Level. - The reliability goal for this equipment shall be 2000 hours, mean-time-between-failures (MTBF).

3.17.3 Reliability evaluation. - Reliability evaluation shall be performed in accordance with the procedures for "Reliability Assurance by analysis and prediction," as specified in MIL-R-22732.

3.17.4 In addition to the regular reliability reports of MIL-R-22732, reliability prediction reports shall be submitted whenever the design changes or addition design data becomes available affecting the prediction.

3.18 Workmanship. - Workmanship shall be in accordance with MIL-E-16400.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. - Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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.

4.2 Classification of inspection. - Inspection shall consist of the following:

- (a) Preproduction inspection.
- (b) Quality conformance inspection.

4.3 Preproduction inspection. - The preproduction sample shall be subjected to the preproduction tests of MIL-E-16400 except that the following tests need not be performed:

- (a) Supply line voltage and frequency.
- (b) Water cooling.
- (c) Enclosure.
- (d) Power.
- (e) Controls and control circuits.
- (f) Accelerated life test.
- (g) Reliability.

In addition the tests specified in 4.3.1.1 through 4.3.1.2.1 and radio interference (see 3.14) shall be performed.

4.3.1 One hundred percent power dissipation (600 watts). - The equipment shall be operated in a normal room temperature (+23°C.) with 600 watts input at 400 mc. and 3000 mc. for a period of 10 hours (at each frequency). The unit shall also be operated over the temperature range of -54°C. to +65°C. with 600 Watts input at 400 mc. If more convenient to the supplier, a higher power than

specified may be used wherever power is specified herein.

4.3.1.1 VSWR tests. - The VSWR measurements shall be made (see 3.5.6) before and after power dissipation and temperature tests of 4.3.1. The unit shall be checked for satisfactory operation at 10, 30, 50, 100, 500, 1000, 1500, 2000, 2500, and 3000 mc. VSWR measurements may be made using a low level signal source (3 volts or less) in conjunction with a slotted line and VSWR amplifier. Three VSWR measurements shall be made at 600 watts input and 50, 400, and 3000 mc.

4.3.2 One hundred fifty percent power dissipation (900 watts). - The equipment shall be operated continuously in a normal room temperature for one quarter hour with 900 watts input at 400 mc.

4.3.2.1 VSWR tests. - The VSWR shall be checked at 50, 100, 500, 1000, 2000, and 3000 mc. after the power dissipation tests of 4.3.2. VSWR measurement may be made using a low level signal source (3 volts or less) in conjunction with a slotted line and VSWR amplifier. One VSWR measurement shall be made at 600 watts input and 400 mc.

4.4 Quality conformance inspection. -

4.4.1 Production inspection. - Production inspection shall be performed in accordance with MIL-E-16400, and shall include the tests of 4.4.1.1 and 4.4.1.2.

4.4.1.1 Power. - The equipment shall be operated in a normal room temperature with 600 watts input at 400 mc. for a period of one quarter hour.

4.4.1.2 VSWR measurements. - VSWR measurements shall be made before and after power dissipation tests of 4.4.1.1. The unit shall be checked for satisfactory operation at 50, 100, 500, 1000, 2000, and 3000 mc. VSWR measurements may be made using a low level signal source (3 volts or less) in conjunction with a slotted line and VSWR amplifier. One VSWR measurement shall be made at 600 watts input and 400 mc.

4.4.2 Production control inspection. - Production control inspection shall be made on one out of ten units produced, and shall consist of the following tests:

- (a) Radio interference as specified in 3.14.
- (b) Weights and dimensions to conform with 3.7 and 3.8.
- (c) Power dissipation and VSWR tests of 4.3.1 and 4.3.2., except that the equipment shall be operated with 600 watts input for 1 hour and 900 watts for one quarter hour.

- (d) Heat test.
- (e) Temperature test.

4.4.3 Environmental tests. - Environmental tests shall be in accordance with MIL-E-16400, and shall be conducted on one out of the first forty production units, and one out of each 100 production units thereafter. During environmental testing of temperature, humidity, and heat tests, the equipment shall be operated with 600 watts input. During shock and vibration testing, the equipment shall be checked for VSWR accuracy at 50, 1000, and 3000 mc. after each vibration cycle, and 50, 1000, and 3000 mc. after each shock blow.

4.5 Tests and test procedures. - At least 30 days prior to testing of the preproduction model(s), the contractor shall submit, via the Government inspector, three copies of the following to the bureau or agency concerned for approval:

- (a) Tests to be performed, including each point to be measured.
- (b) Test procedures to be followed, including the connection, adjustment, measurement, and disconnection of all the equipment, including the test equipment.
- (c) A complete list of the test equipment and accessories (major) to be used, the manufacturer's type number, and the accuracy to be obtainable for the test set-up. Certificates of test equipment calibration accuracy will be necessary prior to the actual testing if any item is considered doubtful by the Government.
- (d) Block diagrams of the test set-up specified in item (b).
- (e) A list of the facilities to be available at the contractor's plant for conducting the preproduction inspection (service conditions) of MIL-E-16400. If these items are to be subcontracted, the prime contractor shall obtain such a list and forward it to the bureau or agency concerned.

5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early equipment installation and for storage of onboard repair parts. -

5.1.1 Dummy load, electrical, 600 watts, d. c. to 3000 mc.

5.1.1.1 Preservation and packaging. - Preservation and packaging shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply

source to the using activity and until early installation and may conform to the supplier's commercial practice when such meets these requirements.

5.1.1.2 Packing. - Packing shall be accomplished in a manner which will insure acceptance by common carrier at the lowest rate and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity for early installation. The shipping containers or method of packing shall conform to the Uniform Freight Classification Rules and Regulations or other carrier regulations as applicable to the mode of transportation and may conform to the supplier's commercial practice when such meets these requirements.

5.1.1.3 Marking. - Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the contractor's commercial practice. The information shall include nomenclature, Federal stock number or manufacturer's part number, contract or order number, contractor's name and destination.

5.1.2 Onboard repair parts. - Onboard repair parts shall be preserved and packaged, packed, and marked as specified in MIL-E-17555.

5.2 Domestic shipment and storage or overseas shipment. - The requirements and levels of preservation and packaging, packing, and marking for shipment shall be specified by the procuring activity (see 6.1).

(5.2.1 The following provides various levels for protection during domestic shipment and storage or overseas shipment which may be required when procurement is made (see 6.1)).

(5.2.1.1 Preservation and packaging, packing, and marking. - The equipment, accessories, technical publications, and repair parts shall be preserved and packaged level A or C, packed level A, B, or C, as specified (see 6.1) and marked in accordance with MIL-E-17555. Method II shall apply for level A packing of equipment except that Method IC5 shall apply where the storage time before use will not exceed 6 months.)

6. NOTES

6.1 Ordering data. - Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Preservation and packaging, packing, and marking requirements if other than specified in 5.1 (see 5.2).

6.2 Preproduction. - Invitations for bid should provide that the Government reserves the right to waive the requirement for preproduction samples as to those bidders offering a product which has been previously procured or tested by the Government,

and that bidders offering such products who wish to rely on such production or test must furnish evidence with the bid that prior Government approval is presently appropriate for the pending procurement.

Preparing activity:
Navy - Ships
(Project 5985-N152Sh)

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BUREAU OF SHIPS
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SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
<u>INSTRUCTIONS</u>		
This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.		
SPECIFICATION		
ORGANIZATION		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT \$
MATERIAL PROCURED UNDER A		
☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? ☐ YES ☐ NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity)		DATE