

# MIL-H-15362B(AER)

15 SEPTEMBER 1958

SUPERSEDES

MIL-H-15362A(AER)

1 JUNE 1954

## MILITARY SPECIFICATION

### HARNESSES, TEST BENCH, AVIONIC EQUIPMENT GENERAL SPECIFICATION FOR

This specification has been approved by the  
Bureau of Aeronautics, Department of the Navy.

#### SCOPE

1.1 Scope - This specification covers the general requirements for the design and fabrication of test bench harnesses for the maintenance of avionic equipment. The detail requirements for specific test bench harnesses will be contained in detail specifications.

#### 2. APPLICABLE DOCUMENTS

2.1 General - The following documents of the issue in effect on the date of invitation for bids, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### Military

MIL-C-5015	Connectors, Electrical, "AN" Type
MIL-E-5400	Electronic Equipment, Aircraft General Specification for
MIL-T-5422	Testing, Environmental, Aircraft, General Specification for
MIL-E-15354	Electrical Test and Maintenance Tables, Table Tops, and Back Panel and Shell Assemblies.
MIL-P-17555	Preparation for Delivery of Electronic Equipment Miscellaneous Electrical Equipment(Except Rotating Electrical Equipment) and Associated Repair Parts
MIL-N-18307	Nomenclature and Nameplates for Airborne Electronic and Associated Equipment
MIL-T-21200	Test Equipment for Use with Electronic and Fire Control Systems, General Specification for

#### STANDARDS

##### Military

MIL-STD-167	Mechanical Vibrations of Shipboard Equipment
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## PUBLICATIONS

Bureau of Aeronautics

NAVAER 16-1-524

Design and Guidance Manual for Test Bench  
Harness

## DRAWINGS

Bureau of Ships

S9101-212410

Shipboard Workbench for Aviation Electronics  
Shops2.2 Availability of Documents

- (1) When requesting applicable documents give both the title and the number. All requests should be made via the cognizant Inspector of Naval Material or Bureau of Aeronautics Representative
- (2) Copies of this specification and applicable documents may be obtained upon application to the Commanding Officer, Naval Aviation Supply Depot (AD), Philadelphia 11, Pennsylvania
- (3) Copies of Bureau of Ships drawings may be obtained upon application to the Bureau of Ships, Navy Department, Washington 25, D.C.

2.3 Precedence - When the requirements of the contract, this specification or applicable subsidiary specifications are in conflict, the following precedence shall apply.

- (1) Contract - The contract shall have precedence over any specification
- (2) This Specification - This specification shall have precedence over all applicable subsidiary specifications. Any deviation from this specification, or from subsidiary specifications where applicable, shall be specifically approved in writing by the Bureau of Aeronautics
- (3) Referenced Specifications - Any referenced specification shall have precedence over all applicable subsidiary specifications referenced therein. All referenced specifications shall apply to the extent specified,

## 3 REQUIREMENTS

3.1 Descriptive

3.1.1 Contents - The test bench harnesses covered by this specification may consist of fixed and portable rack, clamps brackets, junction boxes, cable assemblies, power control and overload protective devices, test points and cooling devices.

3.1.2 Function - The test bench harness shall hold, position, electrically and mechanically connect, cool as necessary, protect from electrical and mechanical damage, and provide suitable auxiliary test points to allow operation and facilitate testing and maintenance of the equipment for which it is designed

3.1.3 Application - The test bench harness shall be suitable for use in shore or ship based workshops in the testing and maintenance of avionics equipment.

3.1.3.1 Installation - The test bench harness shall be designed primarily for installation and operation on benches as specified in Bureau of Ships Drawing S9101-212410(latest revision) but shall, to the greatest extent possible also be designed for installation and operation on benches as specified in Specification MIL- E- 15354

3. 1.3.2 Minimum Space - The test bench harness shall be designed so test the harness, the associated test equipment, and the equipment being tested will occupy a minimum space in the workshop.

3. 1.3.3 Size - The test bench harness shall be designed to pass through an opening 26 by 54 inches with rounded corners of 8 inches radius.

3.1.4 Associated Equipment - The test bench harness shall normally not include items of test equipment (for example, signal generators, power supplies, dummy loads, voltage. current and frequency measuring devices, etc. ) but shall to the greatest practical extent be designed to facilitate the use of all such equipment as may be required in the test and maintenance of the avionic equipment for which the harness is intended.

3. 1.5 Special Test Equipment - The test bench harness shall normally not include any special test equipment unless specifically authorized by the Bureau of Aeronautics. When specifically authorizes such test equipment shall conform to the requirements of Specification MIL-T-21200.

### 3.2 General

3. 2.1 Materials, Parts and Processes - The requirements for materials, parts and processes shall be in accordance with Specification MIL- T- 21200 unless otherwise specified herein.

3. 2.2 Design and Construction - The design and construction of the test bench harness shall be in accordance with the applicable requirements of Specification MIL-T-21200.

3. 2.3 Interchangeability - The test bench harness shall conform to the interchangeability requirements of Specification MIL-T-21200.

3. 2.4 Workmanship - Workmanship shall be in accordance with the requirements of Specification MIL-T-21200.

3.3 Identification and Marking - The test bench harness shall be identified and marked as follows:

3.3.1 Nomenclature and Nameplates - Nomenclature assignment and nameplate approval for test bench harness identification shall be in accordance with the requirements of Specification MIL-N-18307. 18307.

3, 4 Workshop Primary Power - The test bench harness shall be designed on the basis that the following operating power is available in workshops in which the test bench harness is to be used.

<u>Voltage</u>	<u>Frequency</u>	<u>Phase</u>
28	D.C.	-----
208	400	1
115/200	400	3
115	400	1
115	60	1
440	60	3

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3.5 Characteristics of Racks3.5.1 Function - Racks shall secure and position the equipment which is being tested.3.5.2 Position - Racks shall position the equipment or systems under test so as to facilitate the adjustment, alignment testing under power, repair and replacement of components. When necessary, the racks shall allow repositioning Of the equipment either by rotation about one or more axes or by repositioning within a fixed rack.3.5.3 Locks - Simple, quick acting locks shall be provided to assure securing the racks in any allowable position.3.6 Character istics of Clamps and Brackets.6.1 Function - Clamps and brackets shall secure the equipment (see 6. 2) in fixed positions3.6.2 Position - Clamps and brackets shall position the equipment in such a manner as to allow normal operation.3.6.3 Attachment - Clamps and brackets shall provide for simple and quick attachment of the equipment, to the greatest extent practicable.3.7 Characteristics of Junction Boxes3.7.1 Function - Junction boxes shall provide for electrically and mechanically joining cable assemblies of the test bench harness.3.7.2 Mounting - Junction boxes shall be designed for installation on work benches as required by 3. 1. 3.1.3.7.3 Quantity and Type - Normally, the test bench harness shall include junction boxes of the same type, design and quantity as those used in the installation of the equipment in the aircraft or guided missile. In particular cases, additional types, designs or quantities of junction boxes may be included when it can be demonstrated that this will result in economy, reduction in size or weight. simplifcatoon or facilitate installation and use of test bench harness.3.8 Characteristics of Cable Assemblies3.8.1 Types - Cable assemblies shall consist of interconnecting cable assemblies and special test cable assemblies,3.8.2 Function of Interconnecting Cable Assemblies - The interconnecting cable shall provide for electrical connection of units to allow normal operation of the equipment.3.8.3 Quantity And Types of Interconnect ting Cable Assemblies - Normally the test bench h harness shall include interconnecting cable assemblies of the same type, design and quantity as those used in the installation of the equipment in the aircraft or guided missile. In particular cases, additional types, designs or quantities of interconnecting cables may be included when it can be demonstrated that this will result in economy, reduction in size or weight, simplification or will facilitate Installation and use of the test bench harness.3.8.4 Function of Special Test Cable Assembles - Special test cable assemblies, which normally are not required or supplies in the installation of the-equipment, shall be provided when special electrical connections are required m the testing and maintenance of the equipment.

3.8.5 Quantity and Types of Special Test Cable Assemblies - The type design and quantity of special test cable assemblies shall be determined by the contractor and subject to the approval of the Bureau of Aeronautics. The types and quantities shall be minimized. Cable assemblies normally provided with test equipment shall not be included.

3.9 Characteristics of Power Control and Overload Protective Devices.

3.9.1 Function - The power control and overload protective devices shall provide a means to introduce control and protect the source of operating power,

3.9.2 Control - It shall be possible to disconnect completely all operating power. This shall include disc-rig of ground return conductors. This control shall be centralized at a single location and preferably it shall be possible to accomplish this control with a single switching action.

3.9.3 Overload Protection - Circuit breakers or fuses shall be provided to disconnect operating power in the event of electrical load in excess of normal. Such overload protection shall be in accord with the general requirements of Specification MIL-E-5400. Such overload protection shall be designed to prevent damage to both the equipment being tested and the source of operating power.

3.10 Characteristics of Test Points

3.10.1 Function - The test points shall provide for electrically connecting test equipment to the equipment for the purpose of

(a) determining the characteristics of electrical signals within the equipment and /or

(b) introducing test signals into the equipment.

3.10.2 High Voltage Test Points - No test points shall be provided for measuring potentials in excess of 1000 V. Provisions shall be made such that all high voltages may be measured at a potential level of less than 1000 volts.

3.10.3 Connectors - Connectors for milliammeter or voltmeter measurements shall accommodate test prods in accordance with the requirements of Specification MIL-E-5400. Connectors for other than milliammeter and voltmeter measurements shall be in accordance with Specification MIL-C-5015.

3.10.4 Mounting Provisions - Test points will be secured to a structural member of the test bench harness or shall be designed to allow mounting to a workbench as required in 3.1.3.1.

3.11 Characteristics of Cooling Devices

3.11.1 Function - Cooling devices shall provide for maintaining the temperature of equipment within its normal operating range.

3.11.2 Type - These devices shall consist of electric motor driven air blowers with suitable ducts included to direct the cooling air stream

3.11.3 Operating Power - The electric motors shall operate from 103, 5 to 126 5 volts rms. 54-66 cps a. c. power.

3.11.4 Mounting Provisions - The cooling device shall be designed to be mounted either on a structural member of the test bench harness or on a workbench as per 3.1.3.1.

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3.12 Preliminary Plans - Unless otherwise authorized by the Bureau of Aeronautics, the contractor, prior to fabrication or procurement of materials intended for use in fabrication, shall forward to the Bureau of Aeronautics for approval, a description of the test bench harness to be developed or manufactured in accordance with this specification. This description including sketches or drawings, as necessary, shall indicate the recommended physical layout of the test bench harness noting the proposed function, characteristics and application of each item of the harness. Fabrication or the procurement of materials intended for use in the fabrication of the test bench harness shall not be initiated until the Bureau of Aeronautics has approved in writing the proposed physical layout.

3.13 Service Conditions - The test bench harness shall be so designed and constructed that it can withstand without adverse effect, the nonoperating conditions and shall perform satisfactorily when exposed to the operating conditions or natural combinations of conditions as specified below. Satisfactory performance shall mean that the test bench harness shall perform properly and shall not impose on the equipment being tested any conditions which exceed the limits for which that equipment is designed.

### 3.13.1 Temperature

- (a) Operating: Operating over the temperature range of  $-20^{\circ}\text{C}$  to  $+40^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$  to  $104^{\circ}\text{F}$ ). The temperature remaining constant for long periods of time or varying at a rate as high as  $1^{\circ}\text{C}$  per second.
- (b) Nonoperating: Temperature ranging from  $-62^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  ( $-80^{\circ}$  to  $+185^{\circ}\text{F}$ ), the temperature remaining constant for long periods or varying at a rate as high as  $1^{\circ}\text{C}$  ( $1.8^{\circ}\text{F}$ ) per second.

### 3.13.2 Altitude:

- (a) Operating - Operation at barometric pressure ranging from 30 inches of mercury down to 20.6 inches of mercury, (approximately 10,000 feet altitude).
- (b) Nonoperating: Barometric pressures ranging from 30 inches of mercury down to 11.2 inches of mercury (approximately 25,000 feet altitude).

### 3.13.3 Humidity:

- (a) Operating: Operating at relative humidities up to 100% at temperatures up to  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) including conditions wherein condensation takes place in and on the equipment.
- (b) Nonoperating: Relative humidities up to 100% at temperatures up to  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ), including conditions wherein condensation takes place in and on the equipment.

3.13.4 Vibration - The test bench harness shall be so designed and constructed that no fixed part shall become loose, no movable part or control shift in setting, position or adjustment. The harness shall perform satisfactorily, and shall not impose on the equipment being tested any condition which exceeds the limits for which that equipment is designed, when subjected to Type I vibration of MIL-STD-167, frequency range of 5 to 33 cps.

3.13.5 Shock - The test bench harness shall be designed and constructed so that the harness and, the equipment being tested shall not suffer damage or subsequently fail to provide satisfactory performance when subjected to 18 impact shocks of 15 g consisting of three shocks in opposite directions along each of three mutually perpendicular axes, each shock impulse having a time duration of  $11 \pm 1$  milliseconds. The "g" value shall be within  $\pm 10\%$  when measured with a filter having a bandwidth of 0.2 to 250 cps and the maximum "g" shall occur at approximately 5-1/2 milliseconds.

3. 13.6 The test bench harness shall not be adversely affected when exposed to any of the following:

- (a) Salt-sea atmosphere
- (b) Sand and dust particles encountered in desert areas,
- (c) Fungus growth as encountered in tropical climates.

3.14 Detail Specification - Detail requirements for test bench harnesses for specific equipment shall be included in a detail specification. When a detail specification is not available and this general specification is applied on a contract, the contractor shall, prior to fabrication or procurement of materials for use in fabrication of test bench harnesses, prepare and submit a proposed detail specification to the Bureau of Aeronautics for review and approval. The detail specification shall be submitted in the form of military specifications and shall include the requirements of this general specification by reference. Two copies of this proposed detail specification shall be submitted. Fabrication, or procurement of materials for fabrication of test bench harnesses shall not be initiated until receipt by the contractor of approval from the Bureau of Aeronautics of the detail specification.

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#### 4. QUALITY ASSURANCE PROVISIONS

4.1 General - Test bench harnesses shall be subjected to the following tests to determine compliance with all the applicable requirements.

- (1) Preproduction Tests
- (2) Acceptance Tests

4.2 Preproduction Tests - Preproduction tests shall be made on one or more test bench harnesses representative of the production test bench harnesses to be supplied under the contract. Preproduction tests shall consist of the following:

- (1) Contractor's Demonstration Tests
- (2) Service Approval Tests

4.2.1 Contractor's Demonstration Tests - Contractor's demonstration tests shall be accomplished under the responsibility of the contractor and shall be conducted in accordance with the approved test procedure of 4.4. Data obtained by the contractor in conducting these tests shall be submitted to the Bureau of Aeronautics for review and approval prior to shipping the equipment to the specified destination for service approval tests. The Government Inspector and the Bureau of Aeronautics shall be advised when tests are to be conducted so that a representative may be designated to witness or supervise the tests when so desired. Contractors not having adequate facilities to conduct all required tests shall obtain the service of a commercial testing laboratory satisfactory to the Bureau of Aeronautics.

4.2.2 Service Approval Tests - At the completion of the contractor's demonstration tests and when requested by the Bureau of Aeronautics, the test bench harness shall be delivered to a specified government laboratory for additional testing. This additional testing may consist of duplicating tests previously conducted and such other tests deemed necessary to determine compliance with all applicable design and performance requirements.

4.2.3 Scope of Tests - Preproduction tests shall include all tests deemed necessary to determine that the test bench harness meets all the requirements of this specification and the contract. Preproduction tests shall include environmental tests in accordance with Specification MIL-T-5422 where applicable and interference tests in accordance with Specification MIL-I-6181. 6181,

4.2.4 Preproduction Approval - Approval of the preproduction test bench harness shall be by the Bureau of Aeronautics upon satisfactory completion of all tests. No production test bench harnesses shall be delivered prior to the approval of the preproduction model. Prefabrication of production harnesses prior to the approval of the preproduction model is at the contractor's own risk. The approved preproduction model will be returned to the contractor for his use in the fabrication and testing of equipment to be submitted for acceptance. The preproduction model shall not be considered as one of the harnesses under the contract, however, it may be reworked by the contractor and submitted for acceptance as a production harness.

4.3 Acceptance Tests - The contractor shall furnish all samples and shall be responsible for accomplishing the acceptance tests. All inspection and testing shall be under the supervision of the Government Inspector. Contractors not having testing facilities satisfactory to the Bureau of Aeronautics shall engage the service of a commercial testing laboratory acceptable to the Bureau of Aeronautics. The contractor shall furnish test reports showing quantitative results for all acceptance tests. Such reports shall be signed by an authorized representative of the contractor or laboratory, as applicable. Acceptance or approval of material during the course of manufacture shall not be construed as a guarantee of the acceptance of the finished product. Acceptance tests shall consist of the following:



## (1) Individual Tests

## (2) Sampling Tests

4.3.1 Individual Tests - Each harness submitted for acceptance shall be subjected to the individual tests. These tests shall be adequate to determine compliance with the requirements of material, workmanship and operational adequacy. As a minimum, each harness accepted shall have passed the following tests:

## (1) Examination of Product

## (2) operational Test

4.3.1.1 Examination of Product - Each harness shall be examined carefully to determine that the material and workmanship requirements of Specification MIL-E-5400 E- 5400 have been met.

4.3.1.2 Operational Test - Each harness shall be operated long enough to check sufficient characteristics and record adequate data to assure satisfactory performance,

4.3.2 Sampling Tests - Sampling tests shall be as specified in the detail specification.

4.4 Test Procedures - The procedures used for conducting preproduction tests and acceptance tests shall be prepared by the contractor and submitted to the Bureau of Aeronautics or the Government Inspector to modify the tests or require any additional tests deemed necessary to determine compliance with the requirements of this specification or the contract. Specification MIL-T-18030 18303 shall be used as a guide for preparation of test procedures, When approved procedures are available from previous contracts the Bureau of Aeronautics will furnish the procedures to be used for testing.

4.5 Presubmission Testing - NO item part or complete harness shall be submitted by the contractor until it has been previously tested and inspected by the contractor and found to comply, to the best of this knowledge and belief, with all applicable requirements.

4.6 Rejection and Retest - Harnesses which have been rejected may be reworked or have parts replaced to correct the defects and resubmitted for acceptance, Before resubmitting, full particulars concerning previous rejection and the action taken to correct the defects found in the original shall be furnished the Government Inspector. Units rejected after retests shall not be resubmitted without the specific approval of the Bureau of Aeronautics.

4.7 Development and Service Test Contracts - On contracts for development and service test models, approval of the model shall be as required for preproduction models. (see 4.2).

## 5. PREPARATION FOR DELIVERY

5.1 General - All major units and parts of the equipment shall be preserved, packaged, packed and marked for the level of shipment specified in the contract or order in accordance with Specification MIL-P-17555. - 17555.

## 6. NOTES

6.1 Use - This general specification is intended for use as the basic specification applicable on development and initial production contracts where a detail specification does not exist and as a subsidiary specification for detail specifications when written,

6.2 Definitions - The word "equipment" as used refers to the avionic equipment for which the test bench harness mess has been designed for testing unless designated otherwise.

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NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished or in any way supplied the said drawings, specifications or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

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PLATE NO. 15419 (BACK)

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004	
<b>INSTRUCTIONS</b>			
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 (as indicated on reverse hereof).			
SPECIFICATION			
ORGANIZATION (of submitter)		CITY AND STATE	
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT	
		\$	
MATERIAL PROCURED UNDER A			
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> 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?			
<input type="checkbox"/> YES <input type="checkbox"/> 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	