Downloaded from http://www.everyspec.com

MILITARY SPECIFICATION

RACK, INTEGRATED AVIONICS, FORCED AIR COOLED, GENERAL SPECIFICATION FOR

This specification is approved for use within 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 requirements for the design, manufacture, and testing of forced-air-cooled integrated avionics racks, herein after referred to as racks. The racks will be designed to accommodate Standard Electronic Modules (SEM) using multiple tiers. The individual tiers, which must accommodate standard primary backplanes, will be interconnected with a flexible secondary backplane. The enclosure, which provides cooling for the enclosed devices, protection from the environment, and shielding from electromagnetic interference, is to be used for various military avionic systems.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

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, Systems Engineering and Standardization Department (SESD) 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.

AMSC No N3886

FSC 5975

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

Downloaded from http://www.everyspec.com

SPECIFICATIONS

MILITARY

MIL-C-172	-Cases, Bases, Mounting, Vibration Mounts, for use with Electronic Equipment in Aircraft.
MIL-E-5400	-Electronic Equipment, Aerospace, General Specification for.
MIL-T-18303	-Test Procedures; Preproduction, Acceptance and Life for Aircraft Electronic Equipment, Format for.
MIL-C-28754	-Connectors, Electrical, Modular, and Component Parts, General Specification for.
MIL-A-28870	-Assemblies, Electrical Backplane, Printed Wiring Board, General Specification for.
MIL-C-38999	-Connector, Electrical, Circular, Miniature, High Density, Quick Disconnect, Bayonet, Threaded, and Breach Coupling, Environment Resistant, Removable Crimp and Hermetic Solder Contacts, General Specification for.
MIL-P-50884	-Printed Wiring, Flexible, General Specification for.

STANDARDS

MILITARY

MIL-STD-105	-Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129	-Marking for Shipment and Storage.
MIL-STD-454	-Standard General Requirements for Electronic Equipment.
MIL-STD-462	-Electromagnetic Interference Characteristics, Measurement of.
MIL-STD-794	-Parts and Equipment, Procedures for Packaging and Packing of.
MIL-STD-810	-Environmental Test Methods.
MIL-STD-889	-Dissimilar Metal.
MIL-STD-1130	-Connection, Electrical, Solderless Wire Wrapped.

Downloaded from http://www.everyspec.com

MIL-STD-1389 -Design Requirements for Standard Electronic Modules.

2.1.2 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3 and 6.4).

3.2 Materials. The rack design shall make the maximum use of standard (MS, AN, MIL-STD, etc.) parts, materials, and processes. Unless otherwise specified in the contract, a parts control program per MIL-STD-965 shall be implemented (see 6.2.1).

3.2.1 Metals. Metal parts shall be of a corrosion resistant material or shall be suitably treated to resist corrosion during service life.

3.2.2 Dissimilar metals. Where dissimilar metals are used in contact with each other, protection against galvanic corrosion shall be provided. Dissimilar metals shall be in accordance with MIL-STD-889. Dissimilar metals such as brass, copper or steel, shall not be used in contact with aluminum or aluminum alloys. However, spraying, coating or plating of dissimilar metals to provide similar or suitable abutting surfaces is permitted.

3.3 Design and construction. The design and construction of the rack shall be as specified herein. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-E-5400 and shall be subject to procuring activity approval.

3.3.1 Form factor.

3.3.1.1 Overall dimensions. The overall dimensions of the rack shall be kept to a minimum consistent with its structural and performance requirements.

3.3.1.2 Total weight. The total weight of the rack shall be kept to a minimum consistent with its structural and performance requirements.

3.3.1.3 Modularity. The rack shall accommodate two to five tiers. Each tier shall be compatible with either Format B span 2 or Format C modules as specified in MIL-STD-1389. Each tier shall also contain a standard primary backplane. The individual tiers shall be interconnected with a flexible secondary backplane. Each tier shall:

Downloaded from http://www.everyspec.com

a. Have a primary backplane through which the SEMs are interconnected.
b. Have a combination module guide rail and air heat exchanger for module retention and heat dissipation.
c. Provide module retainer mechanisms to secure the modules firmly in place and provide for good thermal contact with the guide rail.
d. Be removable as an assembly, complete with module guide rail and heat exchangers, from the front of the rack.
e. Contain drain holes to allow the escape of water or other fluids from the module compartment.

3.3.1.4 Backplanes. All electrical connections between modules, tiers, and input/output (I/O) connectors shall be through backplanes.

3.3.1.4.1 Primary backplane. The primary backplane will provide the electrical interconnection for the modules. The primary backplane shall be either multilayer printed circuit board in accordance with MIL-A-28870, three layer solderless wire wrap in accordance with MIL-STD-1130, or a combination thereof. If flexible circuitry is required in combination with the above, it shall be in accordance with MIL-P-50884. The mechanical interface of the backplane shall be in accordance with figure 1.

3.3.1.4.2 Secondary backplane. The secondary backplane will provide a flexible interconnection medium for rack input/output (I/O) connectors, primary backplanes, and other associated electrical components. The flexible secondary backplane shall be in accordance with MIL-P-50884.

3.3.1.5 Connectors. Electrical connections shall consist of the connector types specified in 3.3.1.5.1 and 3.3.1.5.2.

3.3.1.5.1 Input/output connectors. The rack shall be capable of accommodating connectors in accordance with MIL-C-38999. Locations shall be provided at the ends which are not plenums of the rack for I/O connector mounting. The I/O connectors and secondary backplane shall be removable from the inside of the enclosure.

3.3.1.5.2 Secondary/primary backplane. There shall be an interface connector between the primary backplane and secondary backplane for the purpose of simplifying the removal of an entire tier. This connector shall be in accordance with MIL-C-28754.

3.3.1.6 Mounting and support. Vibration isolators shall be the primary means of support with the exception of hard mounting applications when specified in the contract (see 6.2.1). No resonant frequency of the rack or any of its components excluding the external isolators shall be below 45 Hz.

Downloaded from http://www.everyspec.com

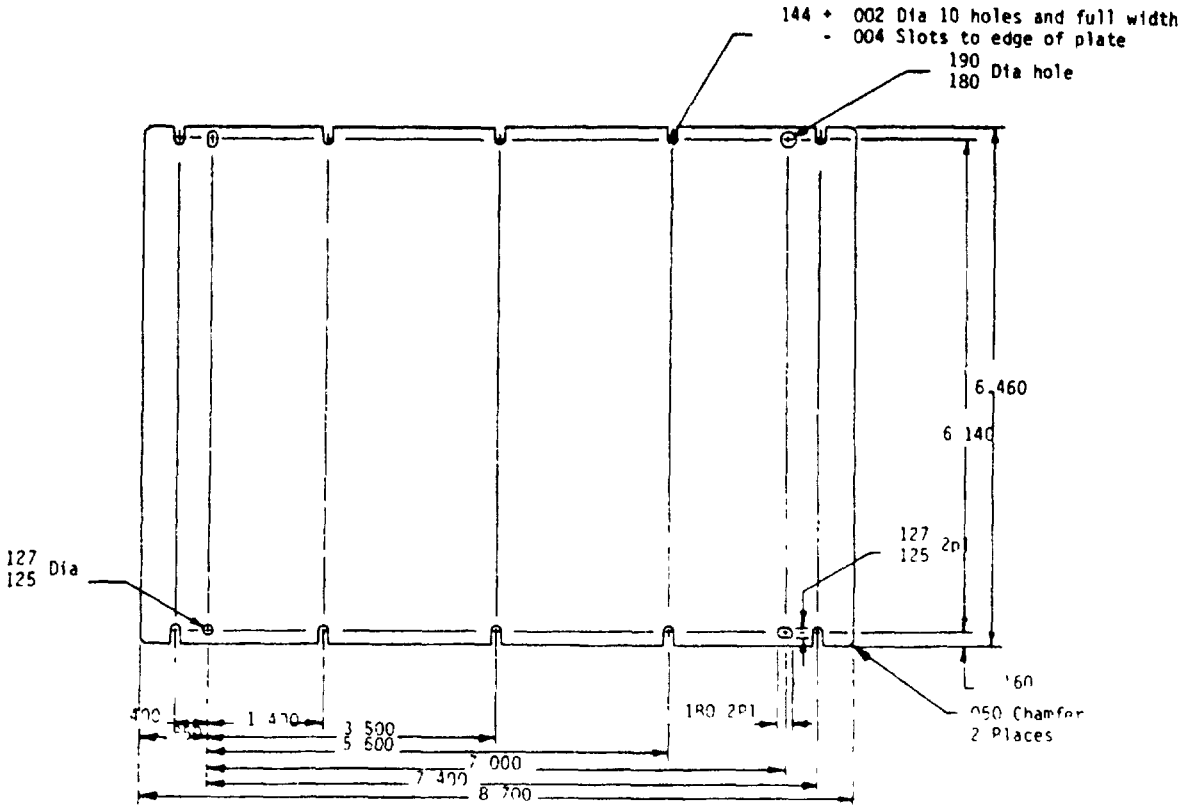

FIGURE 1. Backplane mechanical interfaces.

Downloaded from http://www.everyspec.com

3.3.1.7 Air inlet and outlet. The rack shall be designed to be forced-air-cooled. Cooling air shall not enter the module compartments or the compartment containing the primary or secondary backplane. The cooling air shall enter a plenum on one side of the rack, pass through the heat exchangers into the opposite side plenum, and then exhaust out of the rack. Location of the air inlet and exhaust outlet shall be optional, unless otherwise specified in the contract (see 6.2.1).

3.3.1.8 Module retainer. The retainer mechanism shall be part of the enclosure and not part of the module. The retainer mechanism shall be capable of securing SEM modules firmly in place with a minimum contact pressure of 25 psi. This mechanism shall be shop and depot adjustable or replaceable. The retainers for the Format C module shall not contribute to the insertion or extraction forces.

3.3.1.9 Drain holes. The enclosure shall contain drain holes to allow the escape of fluids which may collect within the module compartment. The rack shall be capable of being mounted in any orientation and shall be designed to avoid any feature which may trap water or other fluids.

3.3.2 Heat exchanger. The heat load shall be removed by the heat exchangers through forced air cooling.

3.3.3 Throttling. The rack shall provide a mechanism for throttling the air flow through each heat exchanger. This mechanism shall be shop and depot adjustable or replaceable.

3.3.4 Identification plate and item markings. Identification and marking shall be in accordance with MIL-E-5400 unless otherwise specified in the contract (see 6.2.1).

3.3.5 Producibility. The final design of the rack shall not depend on any process, innovation, or feature which would restrain normal multiple source competitive procurement by the government and its contractors.

3.3.6 Interchangeability. The rack shall meet the interchangeability requirements of MIL-E-5400.

3.3.7 Maintainability. The rack shall be designed to provide a high degree of maintainability and shall be in accordance with MIL-E-5400.

3.3.8 Reliability. The rack shall be designed to provide a high degree of reliability and shall be in accordance with MIL-E-5400.

3.4 Performance requirements.

3.4.1 Environmental. The rack enclosure shall operate with no degradation of performance or change in physical form in any of the environmental service conditions or any combination of these conditions as specified in MIL-E-5400, class 2X equipment.

Downloaded from http://www.everyspec.com

3.4.1.1 High temperature. The rack shall not bind, crack, craze, discolor or bulge and the gaskets shall not lose their resiliency, or become permanently distorted when tested as specified in 4.5.1.1. The performance of the vibration isolators shall not degrade.

3.4.1.2 Low temperature. The rack shall not bind, crack, craze, discolor or bulge and the gaskets shall not lose their resiliency, or become permanently distorted when tested as specified in 4.5.1.2. The performance of the vibration isolators shall not degrade.

3.4.1.3 Temperature shock. The rack shall withstand the temperature shock test as specified in 4.5.1.3 with no physical or performance degradations.

3.4.1.4 Humidity. The rack shall withstand the humidity test as specified in 4.5.1.4 with no change in mechanical properties, absorption of water, swelling, corrosion or any other forms of deterioration.

3.4.1.5 Fungus. The rack shall withstand the fungus test as specified in 4.5.1.5 with no physical or performance degradation.

3.4.1.6 Salt fog. The rack shall withstand the salt fog test as specified in 4.5.1.6 with no corrosion, deterioration or performance degradation.

3.4.1.7 Acceleration. The rack shall withstand the acceleration test as specified in 4.5.1.7 with no material yield, failure or loss of joint integrity.

3.4.1.8 Vibration. The rack shall withstand the vibration test as specified in 4.5.1.8 with no material yield, failure or loss of joint integrity. The mounting system shall be in compliance with MIL-C-172 except that the transmissibilities of the mounting system shall be not greater than the values shown on figure 2 in any direction of vibration.

3.4.1.9 Shock. The rack shall withstand the shock test as specified in 4.5.1.9 with no material yield, failure or loss of joint integrity.

3.4.1.10 Crash safety. The rack shall withstand the crash safety test as specified in 4.5.1.10 with no failure of the mounting attachment. Bending and distortion shall be permitted, however there shall be no failure to the attaching joints and the equipment shall remain in place.

3.4.2 Mechanical.

3.4.2.1 Guide rails. The guide rails shall not deform or crack when tested as specified in 4.5.2.1.

Downloaded from http://www.everyspec.com

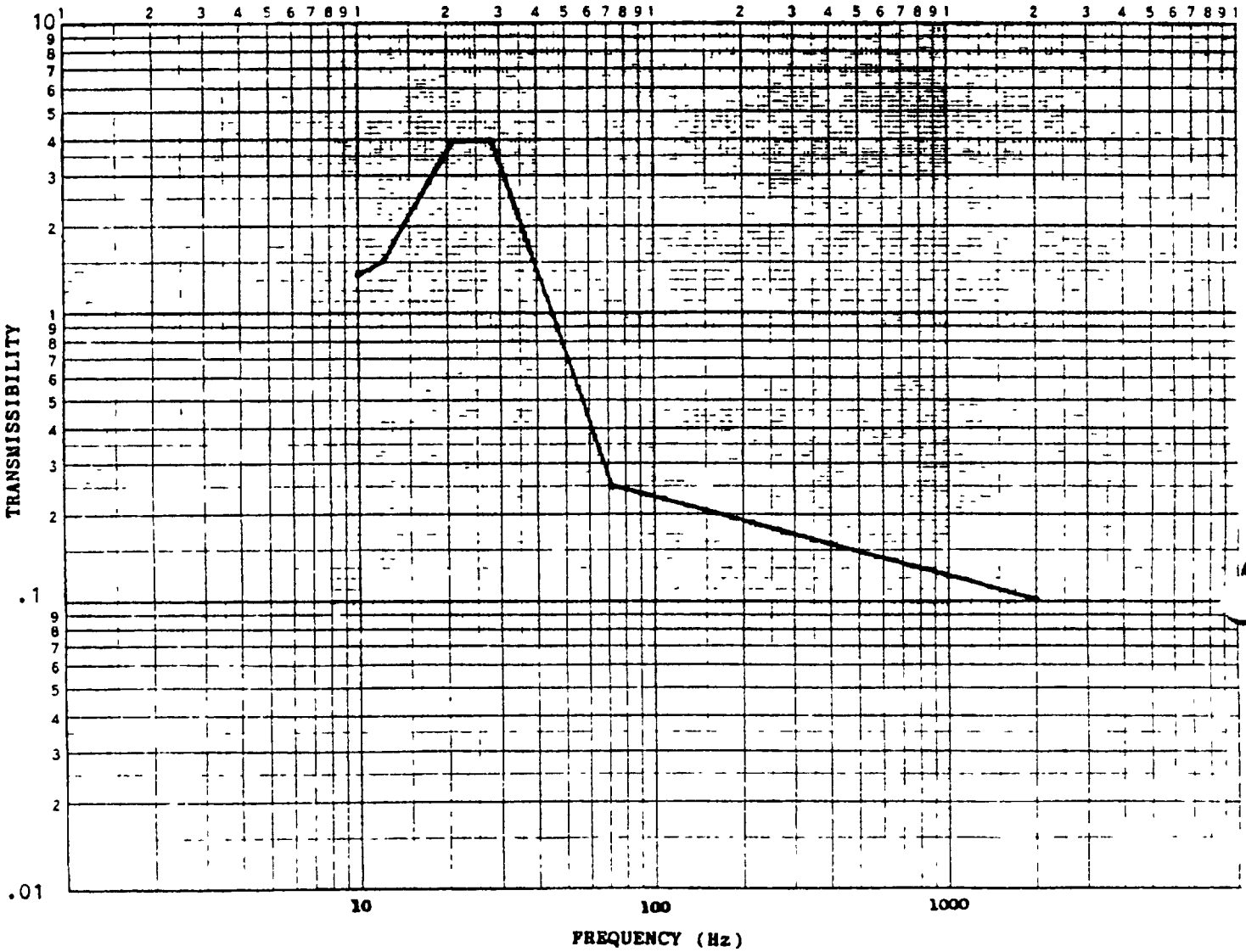

FIGURE 2. Envelope of allowable transmissibility.

Downloaded from http://www.everyspec.com

3.4.2.2 Tier insertion/extraction. The rack shall withstand the test specified in 4.5.2.2 with no physical or performance degradation. Each tier shall be capable of being removed without extracting any modules.

3.4.2.3 Pressure drop. When tested in accordance with 4.5.2.3 the pressure drop from the inlet of each cold rail to its exit shall be not greater than the values given in figure 3 over the entire range of flows shown. Entrance and exhaust pressure losses to and from the cold rail respectively are to be considered part of the cold rail pressure loss. Differences in pressure drops among different cold rails at the like flow rates shall be not greater than two percent. The pressure drop from the inlet of the rack enclosure to (and including) any of the exhaust ports, with no exhaust air collection shall be not greater than the values shown on figure 4 over the entire range of flows shown. Furthermore, the variation in such values among the different exhaust ports shall be not greater than a one percent flow rate differential between any two cold rails at the maximum anticipated flow rate. For the designs where all exhaust air is to be collected and exhausted through one single port, the pressure drop shall be not greater than the values shown on figure 4. Under this condition the flow rate differential between any two cold rails, shall not be greater than one percent at the maximum anticipated flow rate.

3.4.2.4 Leakage. The maximum allowable leakage rate shall be not greater than two percent of the maximum anticipated flow rate through the rack when tested as specified in 4.5.2.4.

3.4.3 Thermal. The rack shall be tested for thermal characteristics as specified in 4.5.3. The rack shall dissipate not less than 250 watts per tier for 26 Format B Span 2 modules dissipating equal power. The rack shall dissipate not less than 500 watts per tier for 26 Format C modules dissipating equal power. The dummy module rib dimensions, material, surface finish and plating shall meet the requirements specified in MIL-STD-1389. The following conditions shall apply:

a.	Cooling air inlet temperature	27 C +/- 1 C
b.	Ambient temperature	71 C +/- 1 C
c.	Maximum pressure drop across tier	2 inches of water
d.	Maximum module guide rib temperature	85 C
e.	Maximum outlet air temperature	71 C

The relative humidity of the cooling air shall be recorded. The design goal for the air flow rate shall be 3 lb/min-KW of cooling air.

3.4.4 Electromagnetic interference.

3.4.4.1 Shielding effectiveness. The rack shall be designed to act as an effective shield against incident electric, magnetic, and electromagnetic field radiation.

Downloaded from http://www.everyspec.com

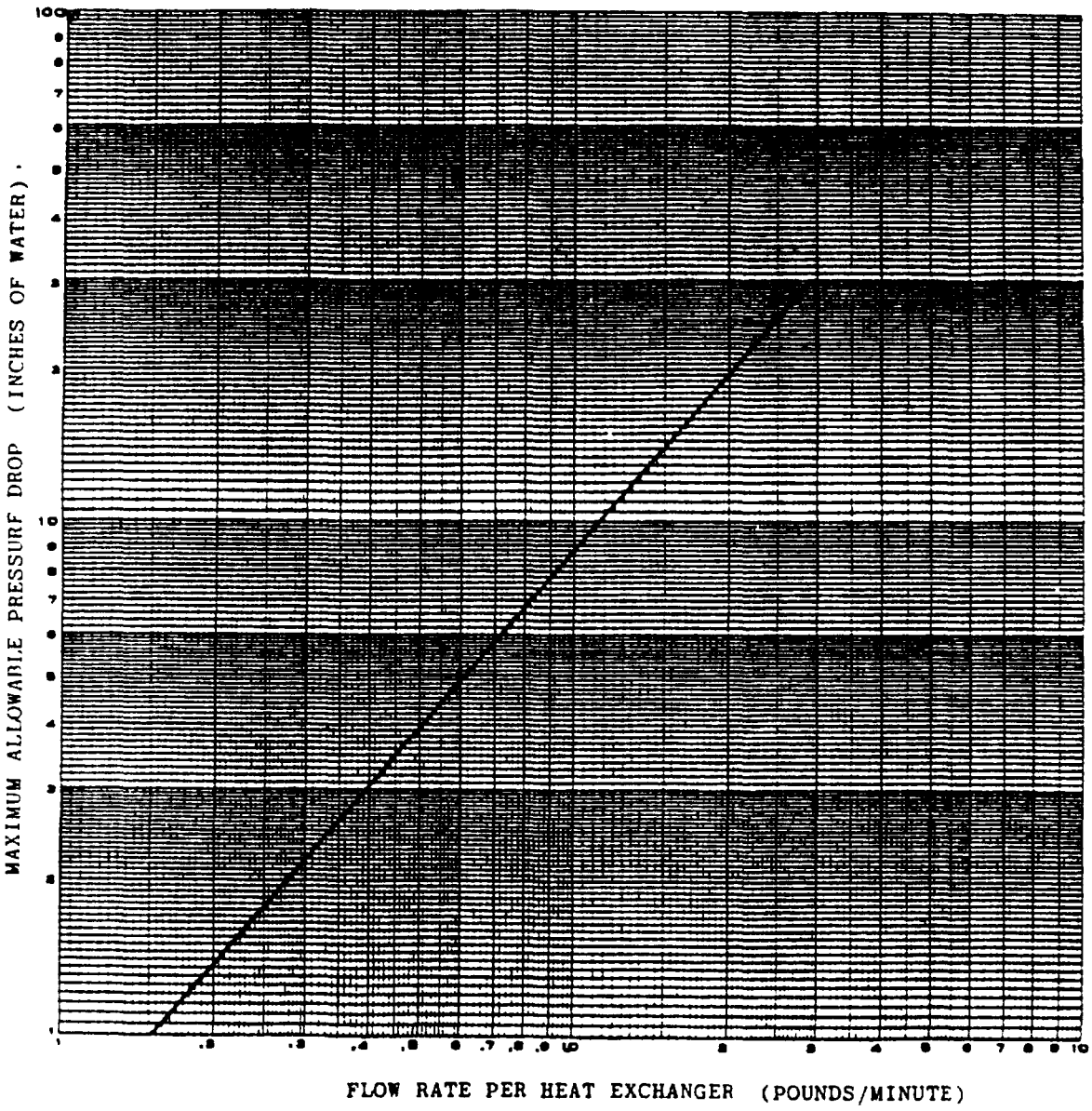

FIGURE 3. Heat exchanger pressure drop.

Downloaded from http://www.everyspec.com

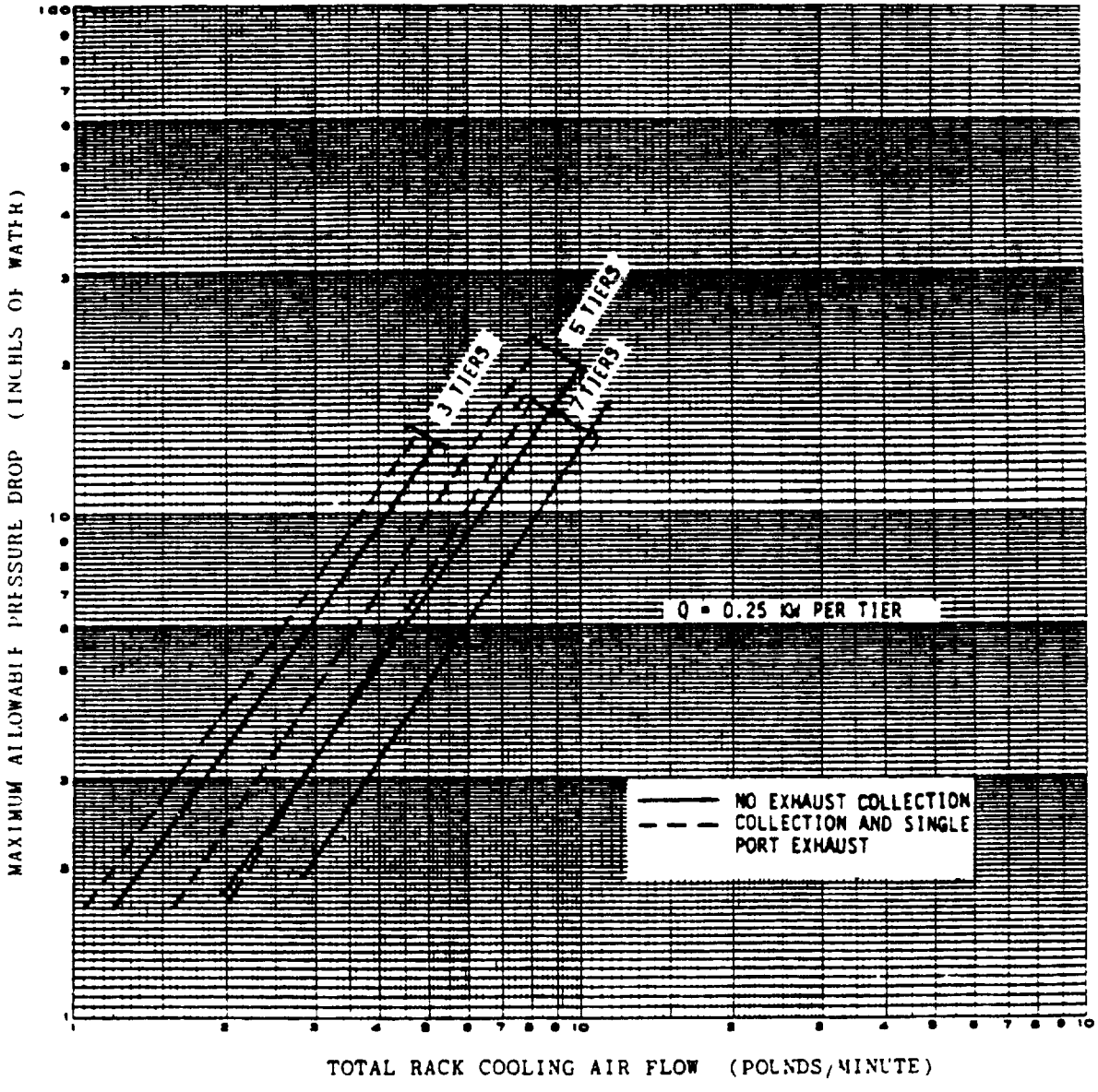

FIGURE 4. Total pressure drop.

Downloaded from http://www.everyspec.com

3.4.4.1.1 Outside-to-inside. The outside-to-inside shielding effectiveness of the rack shall meet the minimal requirements shown on figure 5 when tested in accordance with 4.5.4.1.1.

3.4.4.1.2 Tier-to-tier. The shielding effectiveness between tiers shall meet the minimal requirements shown on figure 6 when tested in accordance with 4.5.4.1.2.

3.4.5 Time elapsed meter. The rack shall be capable of mounting a time elapsed meter. The meter chosen shall be military qualified. Electrochemical deposition meters shall not be used.

3.5 Workmanship. Workmanship shall be in accordance with MIL-STD-454, Requirement 9.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, 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 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (4.3).

b. Quality conformance inspection (4.4).

4.3 First article inspection. Unless otherwise specified in the contract, first article tests shall be performed on two equipment representative of the equipment to be supplied under the contract (see 6.2.1 and 6.2.2). Tests shall be performed in accordance with the approved test procedures.

Downloaded from http://www.everyspec.com

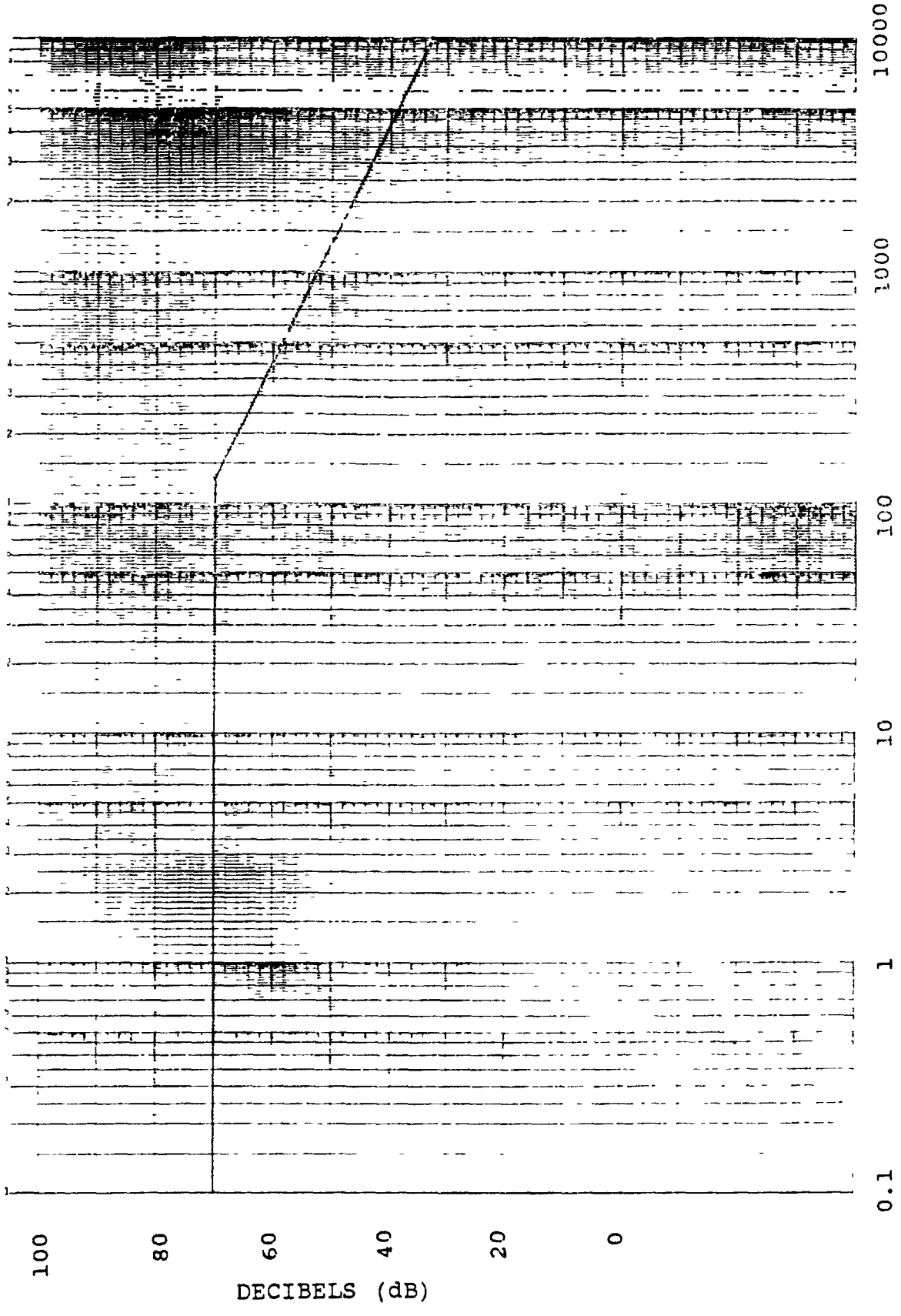

FIGURE 5. Shielding effectiveness, outside-to-inside.

Downloaded from http://www.everyspec.com

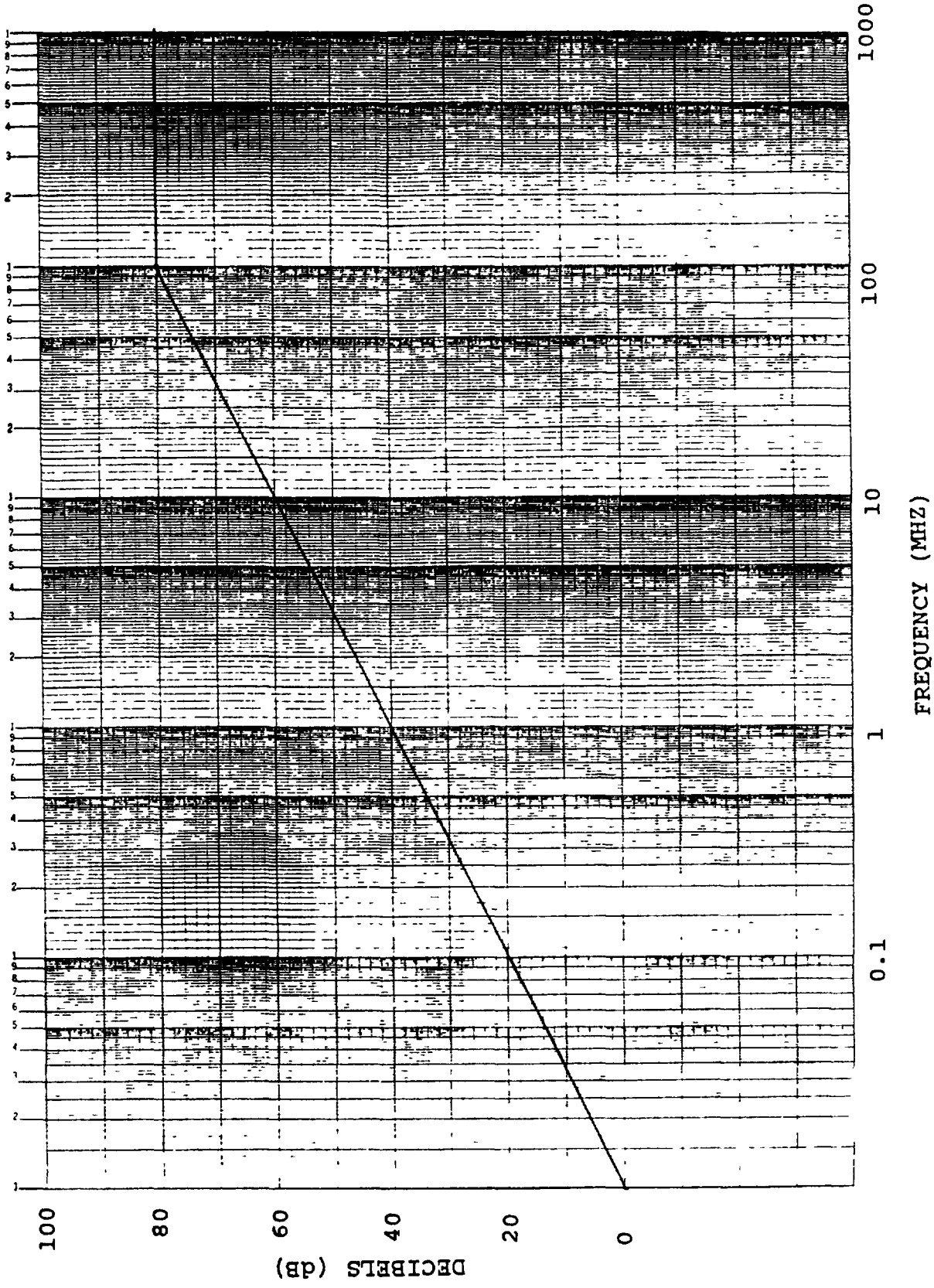

FIGURE 6. Shielding effectiveness between tiers.

Downloaded from http://www.everyspec.com

4.3.1 First article inspection routine. First article inspection shall consist of the examinations and tests specified in table I.

TABLE I. First article inspection.

Inspection	Requirement paragraph	Method paragraph
High Temperature	3.4.1.1	4.5.1.1
Low Temperature	3.4.1.2	4.5.1.2
Temperature shock	3.4.1.3	4.5.1.3
Humidity	3.4.1.4	4.5.1.4
Fungus	3.4.1.5	4.5.1.5
Salt fog	3.4.1.6	4.5.1.6
Acceleration	3.4.1.7	4.5.1.7
Vibration	3.4.1.8	4.5.1.8
Shock	3.4.1.9	4.5.1.9
Crash safety	3.4.1.10	4.5.1.10
Guide ribs	3.4.2.1	4.5.2.1
Tier insertion/extraction	3.4.2.2	4.5.2.2
Pressure drop	3.4.2.3	4.5.2.3
Leakage	3.4.2.4	4.5.2.4
Thermal	3.4.3	4.5.3
Shielding outside-to-inside	3.4.4.1.1	4.5.4.1.1
Shielding tier-to-tier	3.4.4.1.2	4.5.4.1.2

4.4 Quality conformance inspection.

4.4.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspection.

4.4.1.1 Inspection lot. The inspection lot shall consist of all enclosures of the same size and design produced under essentially the same conditions and offered for inspection at one time.

4.4.1.2 Group A inspection. Group A inspection shall consist of the inspections specified in table II.

4.4.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table II.

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph	AQL percent defective
Visual and workmanship	3.2, 3.3	--	0%

Downloaded from http://www.everyspec.com

4.4.1.3 Group B inspection. Group B inspection shall consist of the inspections specified in table III, in the order shown, and shall be performed on sample units which have been subjected to and have passed the group A inspection.

4.4.1.3.1 Sampling plan. The sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table III. Major and minor defects shall be as defined in MIL-STD-105.

TABLE III. Group B inspection.

Inspection	Requirement paragraph	Test method paragraph	AQL percent defective
Dimensional and mechanical	3.3.1, 3.4.2	--	5%

4.4.2 Periodic inspection. Periodic inspection shall consist of group C inspection. Where the results of these inspections show noncompliance with the applicable requirements (see 4.4.2.1.3), the delivery of products that have passed groups A and B shall not be delayed pending the results of these periodic inspections.

4.4.2.1 Group C inspection. Group C inspections shall consist of the inspections specified in table I, in the order shown. Group C inspection shall be performed on sample units which have been subjected and have passed groups A and B inspections.

4.4.2.1.1 Sampling plan. Nine units of the same design shall be subjected to group C inspection. The sample shall not be subjected to any screening test prior to submission.

4.4.2.1.2 Failures. If one or more units fail to pass the group C inspection, the sample shall be considered to have failed.

4.4.2.1.3 Noncompliance. If a sample fails to pass group C inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After corrective action has been taken, group C inspection shall be repeated on additional sample units (all inspections, or the inspection which the original sample failed, at the option of the qualifying activity). Groups A and B may be reinstituted; however, final acceptance and shipment shall be withheld until the group C inspection has shown that the corrective action was

Downloaded from http://www.everyspec.com

successful. In the event of failure after reinspection, the manufacturer shall notify the cognizant activity and qualifying activity (see 6.2.2).

4.5 Inspection conditions. The following conditions shall be used to establish normal performance characteristics under standard conditions and for making laboratory bench tests.

a.	Temperature	Room ambient (25 +/- 10C)
b.	Altitude	Normal ground
c.	Humidity	Room ambient up to 90% relative humidity

4.5.1 Environmental. All structural tests such as vibration, shock, crash safety, and acceleration, shall be performed with the rack at maximum system mass. The maximum system mass is 6.5 Kg/tier for format B modules and 11.5 Kg/tier for format C modules. The tier mass includes all mechanical structure of the tier and dummy modules. Each tier shall be fully loaded with dummy modules of equal weight and dummy backplanes for the maximum system mass. The rack shall be restrained only by its hold-downs.

4.5.1.1 High temperature. The high temperature test shall be performed in accordance with MIL-STD-810, Method 501.2, Procedure II.

4.5.1.2 Low temperature. The low temperature test shall be performed in accordance with MIL-STD-810, Method 502.2, Procedure II.

4.5.1.3 Temperature shock. The temperature shock test shall be performed in accordance with MIL-STD-810, Method 503.2, Procedure I, except that the diurnal cycle shall be replaced by a constant temperature. The five minute maximum transfer time and the test duration of one hour or until stabilization, whichever is longer, shall apply to both hot and cold shocks. The test temperature extremes shall be -57 C and +95 C.

4.5.1.4 Humidity. The humidity test shall be performed in accordance with MIL-STD-810, Method 507.2, Procedure III. This test shall be performed with the enclosure resting on each of three mutually perpendicular surfaces.

4.5.1.5 Fungus. The fungus test shall be performed in accordance with MIL-STD-810, Method 508.3.

4.5.1.6 Salt fog. The salt fog test shall be performed in accordance with MIL-STD-810, Method 509.2, Procedure I.

4.5.1.7 Acceleration. The acceleration test shall be performed as specified in MIL-STD-810, Method 513.3, Procedure I. Acceleration values shall be computed using table 513.3-I for aircraft with a forward acceleration value of 4g.

Downloaded from http://www.everyspec.com

4.5.1.8 Vibration test. The vibration test shall be performed in accordance with MIL-STD-810, Method 514.3, Procedure I, except for the following modifications:

a. Functional levels: The equipment shall be tested for one half hour in each of the three orthogonal axes at the levels shown in table IV (when mounted on vibration isolators) before and after applying the endurance levels specified in b.

b. Endurance levels: The equipment shall be tested for one and one half hours in each of the three orthogonal axes at the levels shown in table IV (when mounted on vibration isolators).

TABLE IV. Random vibration requirements.

Frequency Range (Hz)	Functional Levels (G**2/Hz)	Endurance Levels (G**2/Hz)
20 to 178	.028	.112
178 to 350	+6.5 db/oct	+6.5 db/oct
350 to 1K	.12	.48
1K to 2K	-8 db/oct	-8 db/oct

c. In addition to the above, the rack shall be designed to withstand a minimum rigidity endurance test without the isolators (hard mounted) as specified in Method 514.3 of MIL-STD-810. The following sinusoidal vibration levels shall be applicable:

(1) 5 to 20 Hz 0.1 inch double amplitude
(2) 20 to 2000Hz 2 G peak

4.5.1.9 Shock test. The shock test shall be performed in accordance with MIL-STD-810, Method 516.3, Procedure I. The test level and duration shall be in accordance with I-3.3c.(1)(b) for flight equipment.

4.5.1.10 Crash safety. The crash safety test shall be performed in accordance with MIL-STD-810, Method 513.3, Procedure I when fully loaded with modules. The acceleration value shall be 40g along both directions of three mutually perpendicular axis. Test time shall be one minute for each direction. Bending and distortion shall be permitted, however there shall be no failure to the attaching joints and the equipment shall remain in place.

4.5.2 Mechanical.

4.5.2.1 Guide rails. The dummy modules shall be inserted between every other guide rail and secured firmly in place with module retainers as specified in requirement 3.3.1.8 in order to test the rigidity of the guide rails. The remaining modules will then be inserted and secured.

Downloaded from http://www.everyspec.com

4.5.2.2 Tier insertion/extraction. All of the dummy modules shall be secured firmly in place with module retainers. The tiers shall be extracted and then inserted prior to the leakage test.

4.5.2.3 Pressure drop. All requirements in 3.4.2.3 shall be tested in accordance with contractor-formulated test method (see 6.2.2).

4.5.2.4 Leakage. All requirements in 3.4.2.4 shall be tested in accordance with contractor-formulated test method (see 6.2.2). The enclosure cooling air passages shall be pressurized to not less than two inches of water, at a temperature of 70 F (21 C).

4.5.3 Thermal. All the thermal requirements in 3.4.3 shall be tested in accordance with contractor-formulated test method (see 6.2.2).

4.5.4 Electromagnetic interference.

4.5.4.1 Shielding effectiveness. These tests shall demonstrate that the shielding effectiveness of the rack complies with the requirements specified in 3.4.4.1.

4.5.4.1.1 Outside-to-inside. All requirements specified in 3.4.4.1.1 shall be tested in accordance with contractor-formulated test method (see 6.2.2). The test setup shall be in accordance with MIL-STD-462.

4.5.4.1.2 Tier-to-tier shielding-effectiveness. All requirements specified in 3.4.4.1.2 shall be tested in accordance with contractor-formulated test method (see 6.2.2). The test setup shall be in accordance with MIL-STD-462.

5. PACKAGING

5.1 Integrated rack preservation and packing. Preservation and packing shall be in accordance with Level A, B or C as specified in MIL-STD-794, as specified in the contract or purchase order, without the use of preservation compound (see 6.2.1).

5.2 Packing. Shipping containers may contain a multiple number of racks. The container shall be suitable for Level A, B or C as specified in MIL-STD-794.

5.3 Unitized loading. Unitized loading for the rack is authorized as specified in MIL-STD-794.

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

Downloaded from http://www.everyspec.com

a. ENCLOSURE, INTEGRATED RACK, (no. of tiers) TIERS
b. MILITARY SPECIFICATION NO. MIL-R-85725
c. PRESERVED (date)
d. DOMESTIC OR EXPORT PACKED (as applicable)
e. GOVERNMENT ORDER NO. (or contract no. if order no. is not assigned)
f. NAME OF SUPPLIER (and name of manufacturer if not the same)
g. MANUFACTURER'S CODE IDENTIFICATION NUMBER

6. NOTES

6.1 Intended use. The rack, an example of which is shown on figure 7 and covered by this specification, is intended to accommodate standard avionics modules for use on piloted aircraft. The maintenance of the integrated rack can be performed at the module and/or tier level, where the tier consists of a removable set of modules and primary backplane assembly. The user shall identify the electrical, cooling, and mounting structure interfaces, and their appropriate requirements. Also, the format, type, and location of modules shall be identified.

6.2 Ordering data. Acquisition documents shall specify the following.

6.2.1 Acquisition requirements.

a. Title, number and date of this specification.
b. Implementation of a parts control program, if required (see 3.2).
c. Mounting and support statement, if required (see 3.3.1.6).
d. Location of air inlet and exhaust outlet, if required (see 3.3.1.7).
e. Electrical connector types and position.
f. Number, format, type and placement of modules.
g. Identification plate and item markings, if other than in 3.3.4.
h. Responsibility for inspection (see 4.1).
i. Name and location of approved test laboratory (see 4.1).
j. Number of equipment subjected to first article inspection, if required (see 4.3).
k. Approval of previously used test procedures, if required (see 4.3).
l. Modification of previously used test procedures, if required (see 4.3).
m. Selection of applicable levels of preservation, packaging and packing required (see 5.1 and 5.2).

Downloaded from http://www.everyspec.com

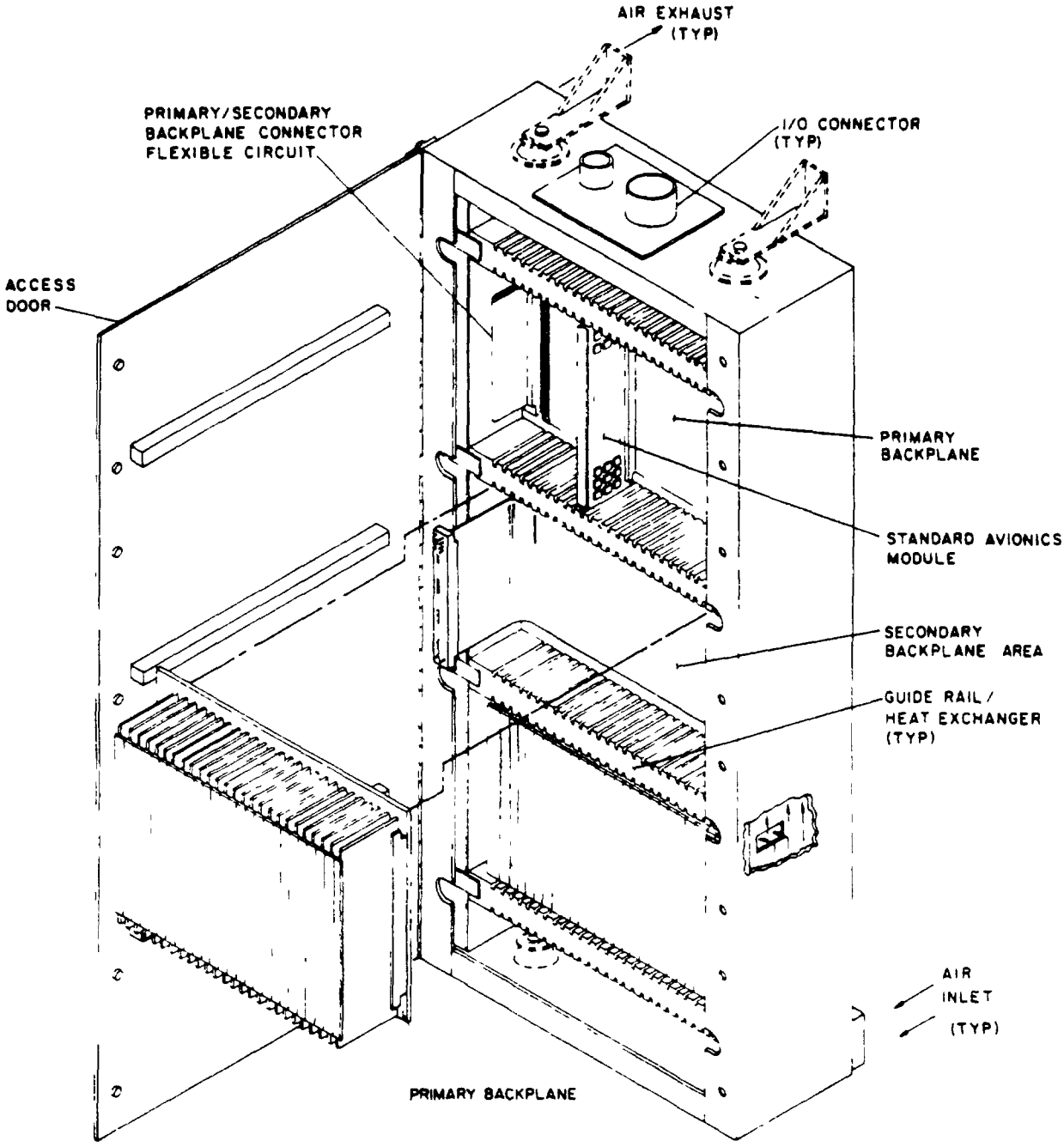

FIGURE 7. Sample integrated rack configuration.

Downloaded from http://www.everyspec.com

6.2.2 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-Part 27.410-6 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification are cited in the following paragraphs.

Paragraph no.	Data requirement title	Applicable DID no.	Option
(a) 4.3	First Article Inspection Procedure	DI-T-4901	--
(b) 4.3	First Article Inspection Report	DI-T-4902	--
(c) 4.4.2.1.3	Failure/Malfunction Report	UDI-T-23724	--
(d) 4.5.2.3	General Test Plan/Procedures	DI-T-3707	--
(e) 4.5.2.4	General Test Plan/Procedures	DI-T-3707	--
(f) 4.5.3	General Test Plan/Procedures	DI-T-3707	--
(g) 4.5.4.1.1	General Test Plan/Procedures	DI-T-3707	--
(h) 4.5.4.1.2	General Test Plan/Procedures	DI-T-3707	--

(Data item descriptions related to this specification, and identified in section 6 will be approved and listed as such in DoD 5000.19-L, AMSDL. Copies of data item descriptions required by the contractors in connection with specific acquisition functions should be obtained from the Naval Publications and Forms Center or as directed by the contracting officer.)

6.2.2.1 Data requirement waivers. The data requirements of 6.2.2 may be waived by the contracting/acquisition activity upon certification by the offeror that identical data were submitted by the offeror and accepted by the Government under a previous contract for identical item acquired to this specification. This does not apply to specific data which may be required for each contract regardless of whether an identical item has been supplied previously (for example, test reports).

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

6.4 First article. When a first article inspection is required, the items should be a first article sample. The first article should consist of two units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for

Downloaded from http://www.everyspec.com

examination, [illegible] disposition of the first [illegible]. [illegible] provide that the Government [illegible] samples for first article [illegible] product which has been previously [illegible], and that bidders offering such [illegible] tion or test, must furnish [illegible] approval is [illegible] rack is procured [illegible] the system modules should be [illegible] complete system. The [illegible] to the manner in which first [illegible] be [illegible].

6.5 Subject term (keywords) listing.

Aircraft
Avionics
Backplane
Modules
Rack

Preparing activity:
Navy (AS)

(Project 5975-N[illegible])

Downloaded from http://www.everyspec.com

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (DO NOT STAPLE), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE: This form may not be used to request copies of documents, nor to request waivers, deviations or clarification of specification requirements on current contracts. 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.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY
Commanding Officer
Naval Air Engineering Center
Systems Engineering Standardization Department
(SESD), Code 93
Lakehurst, NJ 08733

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATE

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 12503 WASHINGTON D C

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Commanding Officer
Naval Air Engineering Center
Systems Engineering Standardization Department
(SESD), Code 93
Lakehurst, NJ 08733

Downloaded from http://www.everyspec.com

(TO DETACH THIS FORM, CUT ALONG THIS LINE)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER

2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION

b. ADDRESS *(Street, City, State, ZIP Code)*

4. TYPE OF ORGANIZATION *(Mark one)*

- ☐ VENDOR
- ☐ USER
- ☐ MANUFACTURER
- ☐ OTHER *(Specify)* _____

5. PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional

b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional

c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional

8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 1426

PREVIOUS EDITION IS OBSOLETE