

INCH-POUND

MIL-DTL-18793B  
18 August 2011  
SUPERSEDING  
MIL-DTL-18793A  
5 April 2006

## DETAIL SPECIFICATION

### ANTENNA AS-333/AP

Inactive for new design  
after 2 February 2001.

This specification is approved for use by all Departments  
and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification establishes the requirements for antenna type AS-333/AP which is a single slot, flush mounted, broadband airborne antenna for use over the frequency range of 420 MHz to 460 MHz.

1.2 Classification. The equipment covered by this specification is of one type and consists of the following:

<u>Major unit</u>	<u>Type designation or part number</u>	<u>Size (inches)</u>	<u>Maximum allowable weight (pounds)</u>
Antenna	AS-333/AP	13 x 4 x 2.75	1.5

#### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

##### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

#### DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-DTL-17 - Cables, Radio Frequency, Flexible and Semirigid, General Specification for.
- MIL-T-152 - Treatment, Moisture- and Fungus-Resistant, of Communications, Electronic, and Associated Electrical Equipment (Inactive for new design).
- MIL-E-5400 - Electronic Equipment, Aerospace, General Specifications for (Inactive for new design).
- MIL-D-18300 - Design Examinations, Engineering Avionic Systems/Equipment, General Specification for.
- MIL-DTL-18307 - Nomenclature and Identification for Aeronautical Systems Including Joint Electronics Type Designated Systems and Associated Support Systems.
- MIL-PRF-39012 - Connectors, Coaxial, Radio Frequency, General Specification for.

Comments, suggestions or questions on this document should be addressed to DLA Land and Maritime, ATTN: VAT, Post Office Box 3990, Columbus, OH 43218-3990, or emailed to [TubesAmps@dla.mil](mailto:TubesAmps@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil>

DEPARTMENT OF DEFENSE STANDARDS

[MIL-STD-810](#) - Environmental Engineering Considerations and Laboratory Tests.

(Copies of the above specifications, standards, and handbooks are available at <https://assist.daps.dla.mil/> or from Standardization Document Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

NAVAL AIR SYSTEMS COMMAND

E-1529 - Antenna AS-333/AP, Assembly and Detail Drawing.  
E-1530 - Antenna AS-333/AP, Case.  
49A1H2 - Antenna AS-333/AP, Component Details.

(Copies of these documents are available from Commander, Naval Air Systems Command, Code 4.1.4, Highway 547, Lakehurst, NJ 08733-5100 or by email at [michael.sikora@navy.mil](mailto:michael.sikora@navy.mil).)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

IPC (Association Connecting Electronics Industries)

[J-STD-004](#) - Soldering Fluxes, Requirements for.  
[J-STD-005](#) - Soldering Pastes, Requirements for.  
[J-STD-006](#) - Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications, Requirements for.

(Applications for copies should be addressed to IPC - Association Connecting Electronics Industries, 2215 Sanders Road, Northbrook IL 60062-6135 or at <http://www.ipc.org>.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Parts and materials. In the selection of parts and materials, fulfillment of major design objectives shall be the prime consideration. In so doing, the following factors shall govern:

- a. Parts and materials approved to specifications listed in [MIL-E-5400](#) shall be given first consideration.
- b. If the contractors can demonstrate that the use of standard AN or JAN parts or materials will not fulfill the design objectives because of size, weight, performance, or other reasons, material and parts shall be used which most nearly meet or exceed the performance requirements of the respective standard specification, provided that no deterioration of size, weight, performance, or reliability will result in the use of such substitutions.
- c. In all cases, the meeting of general material requirements such as non-inflammability, fungus resistance, or non-toxicity and the meeting of environmental conditions as required by [MIL-E-5400](#) or [MIL-STD-810](#) must be of prime consideration.
- d. Pure tin requirements shall be as specified in [3.2.12](#).

3.1.1 Non-standard part approval and material approval. All non-standard parts or materials (parts or materials which do not comply with [MIL-E-5400](#)) of an electrical nature or methods of manufacture therefore and techniques and procedures involving their use and application shall be submitted to the Naval Air Systems Command (see [2.2.2](#)) for approval as required by [MIL-E-5400](#).

3.1.2 Design objectives. Minimum weight, simplicity of operation and an improvement in the performance and reliability of the specific functions beyond the requirements of this specification are objectives in the design of the equipment specified herein. In accordance with [3.1](#), the material, parts, mechanical assemblies, and manufacturing processes shall be in accordance with the requirements of [MIL-E-5400](#); however the use of other materials, parts and processes shall be investigated and if it appears that a substantial reduction in weight or improvement in simplicity or performance can be realized by their use, a request for approval of a non-standard part shall be submitted to the Naval Air Systems Command (see [2.2.2](#)) for consideration. Each request shall be accompanied by complete supporting information.

3.1.3 Soldering. Unless otherwise specified, only non-corrosive core solder in accordance with [J-STD-004](#), [J-STD-005](#) and [J-STD-006](#), class A, shall be used (see [3.2.12](#) and [6.7](#)). Cleaning flux, such as sal ammoniac, shall not be used. Alcohol may be used for cleaning after tinning and soldering (see [3.2.12](#) and [6.7](#)). Mechanical loads shall not be imposed on soldered connections.

3.1.4 Dielectric material. The dielectric material or materials used on the antenna shall be chosen so that the antenna will best fulfill the requirements of this specification. The fiberglass used in the construction of the antennas shall be made of Corning Glass Works type ECC-11-162 (or finer mesh) glass cloth, or equivalent, and shall be impregnated with Bakelite Corporation type BRS-16631 resin, or equivalent.

## 3.2 General design requirements.

3.2.1 General. The antennas shall be designed to meet the requirements of [MIL-E-5400](#) except that in case of conflict between the requirements of [MIL-E-5400](#) and the requirements of this specification, the requirements of this specification shall apply.

3.2.2 Construction. The antenna shall have the dimensions and general features of construction shown on Naval Air Systems Command Drawings E-1529, E-1530, and 49A1H2 (see [2.2.2](#)).

3.2.3 Interchangeability. The antenna shall be so constructed that units of the same type with different serial numbers or manufactured by different manufacturers will be physically and electrically interchangeable. Interchangeability shall be measured against a model or drawings as specified by the acquiring agency for that purpose.

3.2.4 Tropicalization. The antenna shall insofar as practicable be fungus proofed by selection of parts and materials non-nutrient for fungus or the parts and materials shall be treated prior to their use in the antenna so that over all spraying of the equipment is not necessary. Overall spraying of the equipment in accordance with [MIL-T-152](#) shall be made in the event selection of parts and materials described above is not practicable.

3.2.5 RF connectors. The radio frequency (RF) connectors included as a part of the antenna assembly covered by this specification shall be UG-58/U, or equivalent, and shall be in accordance with [MIL-PRF-39012](#).

3.2.6 RF cable. The RF cable included as a part of the antenna assembly covered by this specification shall be RG-58/U and shall be in accordance with [MIL-DTL-17](#).

3.2.7 Impregnated fiberglass. The fiberglass used in the construction of the antennas shall be made of Corning Glass Works ECC-11-162 (or finer mesh) glass cloth, or equivalent, and shall be impregnated with Bakelite Corporation type BRS-16631 resin, or equivalent.

3.2.8 Mating surfaces. When the UG-58/U, or equivalent, connector is mounted on the antenna, the mating surfaces shall be clean metal surfaces, free from all anodizing, grease, paint, lacquer or similar high resistance film, so as to insure negligible radio frequency impedance between the connector and the antenna sleeve.

3.2.9 Weight. The antennas shall be of the lightest practicable weight consistent with the other requirements of this specification and in no event shall the installed weight of the antennas exceed 1.5 pounds. Installed weight shall include the complete antenna assembly with nameplate and receptacle, but shall not include cabling external to the antenna, plugs, mounting nuts or bolts, or any mounting bracket or fastening device which is not an integral part of the antenna assembly.

3.2.10 Identification of product.

3.2.10.1 Nameplates and nomenclature. Nameplate and nomenclature approval and assignment shall be granted by the Naval Air Systems Command only upon compliance with the applicable requirements of [MIL-DTL-18307](#).

3.2.10.2 Use on AN or MIL designations. AN or MIL designations shall not be applied to a product except for preproduction test samples, nor referred to in correspondence, sales matter or otherwise, until notification has been received from the Naval Air Systems Command that the product has been approved. When the antenna is acquired by a prime contractor through subcontract, purchase order, or otherwise (not including Government furnished) the prime contractor shall be responsible for compliance with the requirements of [3.2.3](#) and approval, when granted, will extend only to that one antenna source or to that one prime antenna contract.

3.2.11 Performance. The antenna shall be so designed that when mounted in the center of a large horizontal ground plane, it shall provide vertically polarized radiation of essentially uniform intensity over 360 degrees of azimuth. The antenna shall satisfy the verification requirements which are outlined in section 4 when subjected to the following tests:

3.2.11.1 Radiation test. Radiation test shall be in accordance with [4.5.3](#) and shall satisfy the delta limit criteria of [4.5.3](#).

3.2.11.2 Resistance test. Resistance test shall be in accordance with [4.5.2](#).

3.2.11.3 Voltage standing wave ratio (VSWR) test. VSWR test shall be in accordance with [4.5.4](#) and shall pass the delta criteria of [4.5.4](#).

3.2.12 Pure tin. The use of pure tin as an underplate or final finish is prohibited both internally and externally. The content of the antenna components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass ([see 6.8](#)).

3.3 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4 Workmanship. All details of workmanship shall be in accordance with the best manufacturing practice for high-quality electronic equipment. Particular attention shall be given to neatness and thoroughness in the making of parts, plating, soldering, and finishing.

#### 4. VERIFICATION

4.1 Classification of inspection. The inspection and testing of antennas shall be classified as follows:

- a. Contractor tests ([see 4.2](#))
- b. Preproduction tests ([see 4.3](#))
- c. Inspection tests ([see 4.4](#))

4.2 Contractor tests The contractor tests shall be performed by the supplier, after award of contract and prior to production, at a location acceptable to the Government. One or more sample antennas shall be necessary to determine that the design of the antennas as proposed by the contractor will meet the requirements of this specification. Contractor tests shall be conducted in accordance with the approved preproduction test procedure. Contractors not having laboratory facilities to satisfactorily conduct all tests shall either obtain the services of a commercial testing laboratory or receive written approval from the acquiring activity to omit that portion of the tests (see 6.6).

4.3 Preproduction test.

4.3.1 Sampling instructions. Preproduction test samples consist of three antennas representative of the production antennas to be supplied under the contract. Preproduction tests shall be conducted at laboratory designated by the acquiring activity. Samples shall be plainly identified by securely attached durable tags marked with the information specified below, and forwarded to the laboratory designated in the letter of authorization from the acquiring activity. The contractor shall submit with the preproduction models including manufacturing drawings in accordance with applicable requirements of MIL-D-18300.

Sample for preproduction test  
Antenna AS-333/AP  
Name of manufacturer  
Submitted by (name) (date) for qualifications in accordance with requirements of MIL-DTL-18793 under authorization (reference authorizing letter.)

4.3.2 Scope of tests. Preproduction tests shall include any tests deemed necessary to determine that the antennas meet all the requirements of this specification and the contract, and shall consist of at least the following tests conducted in the order stated:

- First: The service condition tests.
- Second: The resistance test.
- Third: The insulation radiation test.
- Fourth: The VSWR Test.

4.3.3 Model acceptance. Acceptance of the preproduction model shall be by the acquiring activity upon satisfactory completion of all tests. No additional antennas shall be delivered prior to the approval of the preproduction models. Prefabrication of any antennas prior to the approval of the preproduction antennas is at the contractor's own risk. The approved preproduction antennas will be returned to the contractor for his use in the fabrication and testing of the antennas to be submitted for acceptance under the contract. The preproduction antennas shall not be considered as equipment under the contract; however, they may be reworked by the contractor and submitted for acceptance as production equipment.

4.4 Inspection tests. Inspection tests shall be conducted on all antennas submitted for acceptance under contract and on all antennas furnished by the contractor with aircraft or other equipment under contract. Inspection tests shall be conducted at the manufacturer's plant, unless otherwise specified in the contract. Contractors not having laboratory testing facilities shall engage the services of a commercial testing laboratory acceptable to the acquiring activity. The contractor shall furnish test reports, in duplicate, showing quantitative results for all tests required by this specification and signed by an authorized representative of the contractor or laboratory as applicable. Acceptance or approval of material during course of manufacture shall in no case be construed as a guaranty of the acceptance of the finished product.

4.4.1 Scope of tests. Inspection tests shall consist of the following tests:

- a. Individual tests: Each antenna shall be given the following tests:
  - The resistance test.
  - The VSWR test.
  - The visual inspection test.

- b. Sample tests. Sample tests shall be conducted on one antenna selected from each lot of fifty or portion thereof submitted for inspection. Samples shall be selected by the inspector and shall first have passed the individual tests. Sample tests shall be more extensive than the individual tests and shall include any of the tests listed under preproduction tests which are deemed necessary by the inspector in addition to the following tests conducted in the order stated:

First:	The resistance test.
Second:	The radiation test.
Third:	The VSWR test.
Fourth:	The visual inspection test.

4.4.2 Rejection. The acquiring activity reserved the right to reject any materials which have not been subjected to the required tests and found satisfactory.

#### 4.5 Test methods and requirements.

4.5.1 Visual inspection test. The antenna shall be examined visually to determine that it is properly marked, that the dimensions and construction are as specified, that the workmanship is satisfactory, and that it has not yielded or deteriorated physically under any of the other tests (see 3.1, 3.2, and 3.4).

4.5.2 Resistance test. The continuity of the circuit between the terminals of the antenna shall be assured by measuring the dc resistance between the terminals in accordance with the best commercial practice. The dc resistance between the terminals of the antenna shall not exceed 0.1 ohm.

4.5.3 Radiation test. The radiation test shall consist of connecting the antenna through a fifty foot length of RG-21/U cable to a monitored signal source tuned to one frequency within the frequency range of the antenna and observing the relative level of energy radiated from the antenna as indicated in the output meter of an RF receiving device tuned to the same frequency as the signal source. The relative level of energy radiated from the antenna shall not vary more than ten percent above or below the level of a model or value as supplied by the acquiring service for this purpose.

4.5.4 VSWR. The VSWR shall be determined in accordance with the best commercial procedure when the antenna is mounted centrally on and flush with the surface of a square ground plane not less than 10 feet on a side. Measurements shall be made at 5 MHz intervals from 400 MHz to 480 MHz, inclusive. At all frequencies between 400 MHz and 480 MHz, the VSWR shall be equal to or less than 2.0 to 1.

4.5.5 Service conditions test. The service condition test shall be conducted in accordance with all of the requirements of MIL-STD-810.

### 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

### 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The AS-333/AP antenna is intended for use with airborne receiving and transmitting equipment in the frequency range from 400 to 480 MHz. A 50-ohm RF transmission line (such as RG-58/U is required between the equipment and the antenna.)

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of the specification.
- b. Packaging requirements (see 5.1).

6.3 Details of construction. This specification is not intended to be restrictive with respect to the details of construction, except where such details are specified. Alternate forms of construction will be considered, provided that the contractor submits to the acquiring activity for approval a clear description of the points of difference and further provided that all performance requirements of this specification are met.

6.4 Subject term (key word) listing.

dielectric  
fiberglass  
radiation test  
radio frequency  
RF connectors  
RF transmission line  
tropicalization  
VSWR

6.5 Definitions.

6.5.1 Contractor tests: Contractor tests are those tests conducted by the contractor on an antenna to determine that the antenna complies to the best of their knowledge and belief with all applicable requirements.

6.5.2 Preproduction tests: Preproduction tests are conducted at laboratory designated by the acquiring activity, after the award of the contract, on samples which are representative of the production antennas to determine that the antenna meets all the requirements of this specification.

6.5.3 Inspection tests: Inspection tests are those tests performed on the antenna submitted for acceptance under the contract.

6.6 Inspection approval. Approval of products covered by this specification should be obtained from the acquiring activity.

6.7 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website at <http://www.epa.gov/osw/hazard/wastemin/priority.htm>. Included in the list of 31 priority chemicals are cadmium, lead, and mercury. Use of the materials on the list should be minimized or eliminated unless needed to meet the requirements specified herein (see section 3).

6.8 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers (see 3.2.12). For additional information on this matter, refer to ASTM-B545 (Standard Specification for Electrodeposited Coatings of Tin.)

6.9 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

MIL-DTL-18793B

Custodians:  
Navy - AS  
Air Force - 85  
DLA - CC

Preparing activity:  
DLA - CC

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NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.daps.dla.mil>.