

MILITARY SPECIFICATION

ANTENNA AS-333/AP

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

1. SCOPE AND CLASSIFICATION

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 megacycles per second to 460 megacycles per second.

1.2 Classification - The equipment covered by this specification shall be of one type and shall consist of the following:

<u>Maj. Unit</u>	<u>Type Designation</u>	<u>Size (inches)</u>	<u>Max. Allow. weight Lbs.</u>
Antenna	AS-333/AP	13 x 4 x 2-3/4	1.5

2. APPLICABLE DOCUMENTS

2.1 General - The following specifications, standards, drawings and publications of the issue in effect on the date of invitation for bids, form a part of this specification to the extent specified herein

2.2 Specifications

Federal

QQ-S-571 Solder, Soft (Tin, Tin Lead and Lead Silver)

Military

MIL-C-71 Connectors, "N" for Radio Frequency Cables

MIL-V-173 Varnish, Moisture-and Fungus-Resistant, for the Treatment of Communications, Electronic and Associated Electrical Equipment

MIL-E-5400 Electronic Equipment, Airborne, General Specification

MIL-T-5422 Testing; Environmental, Aircraft Electronic Equipment

MIL-P-6064 Packaging of Lightweight Aircraft Accessories

MIL-N-18307 Nomenclature and Nameplates for Aircraft Electronic and Associated Equipment

MIL-T-18303 Test Procedures, Preproduction and Inspection
Format for

JAN-C-17 Cable, Coaxial and Twin Conductor for Radio
Frequency

Standards

MIL-STD-129 Marking for Shipment and Storage

2.3 Drawings

Bureau of Aeronautics

E-1529 Antenna AS-333/AP, Assembly and Detail Drawing
E-1530 Antenna AS/333/AP, Case
4PA1H2 Antenna AS/333/AP, Component Details

2.4 Availability of Specifications, Publications and Drawings:

- (1) When requesting specifications, publications and drawings refer to both title and 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 specifications and publications may be obtained upon application to the Commanding Officer, Naval Air Station, Johnsville, Pennsylvania. Attn: Technical Records Division.
- (3) Copies of applicable Bureau of Aeronautics drawings may be obtained upon application to Bureau of Aeronautics, Navy Department, Washington 25, D. C. Attn: Electronics Division.

2.5 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 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:

- (1) Parts and Materials approved to specifications listed in MIL-E-5400 shall be given first consideration.
- (2) 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.

- (3) In all cases, the meeting of general material requirements such as non-inflammability, fungus resistance, nontoxicity, etc. and the meeting of environmental conditions as required by the specification MIL-E-5400 or MIL-T-5422 must be of prime consideration.

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 therefor and techniques and procedures involving their use and application shall be submitted to the Bureau of Aeronautics for approval as required by specification 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 paragraph 3.1 the material, parts, mechanical assemblies and manufacturing processes shall be in accordance with the requirements of Specification 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 Bureau of Aeronautics for consideration, each request should be accompanied by complete supporting information.

3.1.3 Soldering - Unless otherwise specified, only non-corrosive core solder in accordance with Specification QQ-S-571, class A, shall be used. Cleaning flux, such as sal amoniac, shall not be used. Alcohol may be used for cleaning after tinning and soldering. 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.

3.1.5 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.

3.2 General Design Requirements -

3.2.1 General - The antennas shall be designed to meet the requirements of specification MIL-E-5400 except that in case of conflict between the requirements of specification 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 Bureau of Aeronautics Drawings E-1529 and E-1530 and 49A1H2.

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 supplied by the procuring 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 JAN-T-152 shall be made in the event selection of parts and materials described above is not practicable.

3.2.5 R-F Connectors - The R-F 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 Joint Army-Navy Specification JAN-C-71.

3.2.6 R-F-Cable - The R-F cable included as a part of the antenna assembly covered by this specification shall be RG-58/U and shall be in accordance with Joint Army-Navy Specification JAN-C-17.

3.2.7 Impregnated Fiberglass - 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.

3.2.8 Mating Surfaces - When the UG-58/U, or equivalent, connector is mounted on the antenna (as shown on the Bureau of Aeronautics drawing listed under paragraph A-2) 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 Bureau of Aeronautics only upon compliance with the applicable requirements of MIL-N-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 Bureau of Aeronautics that the product has been approved. When the antenna is procured 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 paragraph 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 performance requirements which are outlined in Section 4 when subjected to the following tests:

- (a) Mechanical Stress Test
- (b) Insulation Test
- (c) Radiation Test
- (d) Voltage Standing Wave Ratio Test

4 QUALITY ASSURANCE PROVISIONS

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

- (a) Contractor Tests - Contractor tests are those tests conducted by the contractor on an antenna to determine that the antenna complies to the best of his knowledge and belief with all applicable requirements.
- (b) Preproduction Tests - Preproduction tests are conducted by the procuring agency, after the award of the contract, on Samples which are representative of the production antennas to determine that the antenna meet all the requirements of this specification.
- (c) Inspection Tests - Inspection tests are those tests accomplished on the antenna submitted for acceptance under the contract.

4.2 Contractor Tests - The contractor shall conduct tests on one or more sample antennas as 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. The data obtained by the contractor in conducting these tests shall be included with the design data submitted with the preproduction test antennas. The Inspector of Naval Material and the Bureau of Aeronautics shall be advised when tests are to be conducted so that the Bureau of Aeronautics may designate a representative to witness or supervise the test when so desired. When tests are supervised the Bureau of Aeronautics may decide to omit certain portions of the preproduction tests which will duplicate the contractor tests, however, in conducting preproduction tests the Bureau of Aeronautics may elect to repeat any test previously conducted by the contractor, when deemed necessary. (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 Bureau of Aeronautics to omit that portion of the tests.)

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 Bureau of Aeronautics. Samples shall be plainly identified by securely attached durable tags marked with the information specified below, and forwarded with design data to the laboratory designated in the letter of authorization from the Bureau of Aeronautics.

Sample for Preproduction Test
 Antenna AT-333/AP
 Name of Manufacturer
 Submitted by (name) (date) for qualifications in accordance
 with requirements of Specification MIL-A-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 Voltage Standing Wave Ratio Test

4.3.3 Design Data - The contractor shall submit with the preproduction models complete design data including manufacturing drawings in accordance with applicable requirements of MIL-D-18300.

4.3.4 Model Acceptance - Acceptance of the preproduction model shall be by the Bureau of Aeronautics 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 preproducing antennas shall not be considered as equipments 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 under the supervision of the Naval Inspector, unless otherwise specified in the contract. Contractors not having laboratory testing facilities satisfactory to the Naval Inspector shall engage the services of a commercial testing laboratory acceptable to the Procuring Service. 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 Voltage Standing Wave Ratio 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 Voltage Standing Wave Ratio Test
Fourth	- The Visual Inspection Test

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 its 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.

4.5.2 Resistance Test - The continuity of the circuit between the terminals of the antenna shall be assured by measuring the D-C resistance between the terminals in accordance with the best commercial practice. The D-C 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 fre-

quency 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 R-F 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 procuring service for this purpose.

4. 5. 4 Voltage Standing Wave Ratio - The voltage standing wave ratio 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 mc/s intervals from 400 mc/s to 480 mc/s inclusive. At all frequencies between 400 and 480 megacycles per second the voltage standing wave ratio 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 the requirements of specification MIL-T-5422.

5 PREPARATION FOR DELIVERY

5. 1 General - The antennas shall be protected from corrosion or deterioration during shipment and storage. Each antenna shall be packaged, packed and marked for equipment in accordance with the requirements of Specification MIL-P-6064. Group XI, Type I packing method shall be used. Shipment marking shall be in accordance with the requirements of specification MIL-STD-129.

6. NOTES

6. 1 Use - The AS/333/AP antenna is intended for use with airborne receiving and transmitting equipment in the frequency range from 400 to 480 megacycles per second. A 50-ohm r-f transmission line (such as RG-58/U is required between the equipment and the antenna.)

6. 2 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 Bureau of Aeronautics for approval a clear description of the points of difference and further provided that all performance requirements of this specification are met.

6. 3 The right is reserved to reject any materials which have not been subjected to the required tests and found satisfactory.

PATENT 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.