

MIL-A-28737A(EC)
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~~SUPERSEDING~~
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MILITARY SPECIFICATION
 ANTENNA, IFF, AS-2188() (3METERS) (10FEET), AS-2189
 (1.8 METERS (6 FEET))

This specification is approved for use by the Naval Electronic 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 This specification covers the performance of the IFF, AS-2188 (3 meters (10 feet)) and IFF, AS-2189 (1.8 meters (6 feet)) antennas with ISLS Interrogator Side Lobe Suppression (ISLS) capability, for installation aboard Naval vessels. An antenna consists of a directional IFF Antenna, whose halves may be fed separately and independently, a Hybrid Assembly and a Backfill Radiator.

2. APPLICABLE DOCUMENTS

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

SPECIFICATIONS

FEDERAL		
QQ-P-416	-	Plating, Cadmium (Electrodeposited)
MILITARY		
MIL-C-17/74	-	Cable, Radio Frequency, Coaxial
MIL-S-901	-	Shock Tests, H.I. (HIGH-IMPACT), Shipboard Machinery, Equipment and Systems, Requirements for
MIL-E-16400	-	Electronic Interior Communication and Navigation Equipment, Naval Ship and Shore, General Specification For
MIL-E-17555	-	Electronic and Electrical Equipment, Accessories, and Repair Parts, Packaging and Packing of

STANDARDS

MILITARY		
MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-108	-	Definitions of and Basic Requirements for Enclosures for Electric and Electronic Equipment
MIL-STD-109	-	Quality Assurance Terms and Definitions
MIL-STD-167	-	Mechanical Vibrations of Shipboard Equipment.
MIL-STD-454	-	Standard General Requirements for Electronic Equipment
MIL-STD-810	-	Environmental Test Methods

PUBLICATIONS

MILITARY		
MIL-HDBK-216	-	RF Transmission Lines and Fittings

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Electronic Systems Command, Washington, D.C. 20360 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposals shall apply.

NATIONAL BUREAU OF STANDARDS
Handbook H28 - Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.)

3. REQUIREMENTS

3.1 General. The equipment shall be in accordance with the requirements of MIL-E-16400 except as hereinafter specified. Screw threads and screw thread devices shall be in accordance with Handbook H28 (NBS).

3.2 First article sample. When specified (see 6.2), the contractor shall furnish sample units for first article inspection and approval (see 4.3 and 6.3).

3.3 Reliability

3.3.1 Quantitative reliability requirement. The equipment shall be designed to have a minimum acceptable mean-time-between-failure (MTBF) of 10,000 hours.

3.4 Design requirements.

3.4.1 Construction. The requirements of modular construction in MIL-E-16400 are not applicable. The antenna shall be constructed as one unit. The equipment shall be constructed to prevent internal accumulation of water or moisture that would adversely affect the RF performance.

3.4.2 Environmental service conditions.

3.4.2.1 Temperature. The equipment shall be designed to meet the Range 2 temperature requirements of MIL-E-16400, except that the upper limit shall be 150°C (302°F). The contractor shall test the operation of the antenna at this temperature.

3.4.2.2 Salt fog. The equipment shall be capable of withstanding the effects of the salt fog test specified herein. After completion of the test and cleaning, the base metal of the antenna shall not be visible through the finish, nor shall there be any evidence of blistering, softening, separation from the base metal, corrosion products, or other coating failure. The equipment shall maintain the specified performance after completion of the salt fog test.

3.4.2.3 Hydrostatic pressure. Hydrostatic pressure is not applicable.

3.4.3 Electrical design.

3.4.3.1 The radio frequency (RF) system of this equipment shall be capable of carrying pulses of RF energy of 10 kilowatts (kw) peak power at one percent duty cycle without breakdown, under service conditions.

3.4.3.2 Overload protection is not required.

3.4.3.3 Connectors and cables. RF type N connectors shall be used in this equipment and shall be selected from MIL-HDBK-216. Cables shall be in accordance with MIL-C-17/74.

3.4.3.4 RF feed system. The antennas shall have two RF input connectors to implement interrogation side lobe suppression. When fed from one input, a "sum" radiation pattern shall be generated. When fed from the other input, a "difference" pattern shall be generated. When using the "difference" input, a portion of the signal shall be routed from the "difference" input to the backfill radiator via a directional coupler, sufficient to exceed the "sum" pattern back lobe by at least 4.0 decibels (dB).

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3.4.4 Maintenance.

3.4.4.1 Test points and test features are not required.

3.4.5 Mechanical.

3.4.5.1 Shock requirements shall be for Grade A, Class I, lightweight, Type A of MIL-S-901.

3.4.5.1.1 The vibration requirements shall be Type I of MIL-STD-167.

3.4.5.1.1.1 The inclination requirements are not applicable.

3.4.5.2 Exposure. The equipment shall be designed to withstand the conditions incident to its exposed location on Naval vessels, and shall be watertight.3.4.5.3 Materials and protection.3.4.5.3.1 Hardware. All hardware shall be CRES 300 series, cadmium plated in accordance with QQ-P-416, Type II, Class 3.3.4.5.3.2 Painting, undercoats. Except where application would degrade antenna performance, all exterior surfaces of the antenna and its coaxial conductors shall be spray-painted prior to assembly with the following, or its equivalent:

<u>Coating</u>	<u>Dry Film Thickness</u>
1st coat: Devran 201 Lt. Green	2-3 mils
2nd coat: Devran 201 Buff	2-3 mils
3rd coat: Devran 209 Haze Gray No. 27	2-3 mils

Three coats shall be applied to each part unless otherwise specified.

3.4.5.3.3 Painting, finish. After assembly and testing, the complete antenna assembly shall be spray-painted with one coat (2-3 mil thickness) of Devran 209 Haze Gray No. 27, except where application will degrade antenna performance.3.5 Electrical requirements3.5.1 AS-2188 () antenna. The AS-2188 () antenna shall have the following electrical characteristics over the frequency range of 1030 \pm 10 megahertz (MHz) when energized through the feed system and pedestal:

- (a) Vertical polarization.
- (b) A mean impedance of 51 ohms nominal (both inputs).
- (c) A voltage standing wave ratio not greater than 3.6 dB at the input terminals to the antenna.
- (d) Gain of at least 18.5 dB referenced to an isotropic radiator.
- (e) A horizontal sum pattern with main lobe beam width of not more than 7.3 degrees at 3 dB below maximum and not more than 20 degrees at 20 dB below maximum of the main lobe. Maximum of the side lobes shall be at least 26 dB below the maximum of the main lobe, and the maximum of the back lobe shall be at least 26 dB below the maximum of the main lobe.
- (f) The horizontal "difference" pattern shall cover all side lobes and back lobes by at least 4.0 dB. The depth of the null at 0° (the "sum" pattern main beam) shall be at least 30 dB below the "sum" pattern main beam maximum point. The "difference" pattern shall be designed to obtain the greatest degree of "beam" sharpening possible.