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Detector, Ice, Air Intake Duct, Aircraft Engines
and Airframe Systems, General Specification For

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1. SCOPE:

1.1 Scope:

This specification establishes requirements for ice detectors.

1.2 Classification:

This specification establishes requirements for two types of ice detectors (see 6.2):

Type I: Those ice detectors that require ice buildup on the probe for detection.

Type II: Those ice detectors that detect impending ice and do not require ice buildup on the probe for detection.

2. APPLICABLE DOCUMENTS:

- 2.1 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-P-116	Preservation, Methods of
MIL-C-5015	Connectors, Electric, "AN" Type
MIL-B-5087	Bonding, Electrical (for Aircraft)
MIL-E-5272	Environmental Testing, Aeronautical and Associated Equipment, General Specification for
MIL-E-5400	Electronic Equipment, Aircraft, General Specification for
MIL-E-5557	Enamel, Heat-Resisting, Glyceryl-Phthalate, Black
MIL-D-6055	Drums, Metal Reusable, Shipping and Storage (Capacity from 88 to 510 Cubic Inches)
MIL-I-6181	Interference Control Requirements, Aircraft Equipment
MIL-S-6743	Switches, Push Button and Limit
MIL-S-7742	Screw Threads, Standard Optimum Selected Series: General Specification for
MIL-L-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-P-7936	Parts and Equipment, Aeronautical, Preparation for Delivery
MIL-P-8585	Primer Coating, Zinc Chromate, Low-Moisture-Sensitivity
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-N-25027	Nut, Self-Locking, 250°F, 500°F, and 800°F, 125 KSI FTU, 60 KSI FTU, and 30 KSI FTU
MIL-D-70327	Drawings, Engineering and Associated Lists

STANDARDS

Military

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-143	Specifications and Standards, Order of Precedence for the Selection of
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization of
MIL-STD-831	Test Reports, Preparation of

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2.1 (Continued):

MS20995	Wire, Lock
MS33540	Safety Wiring, General Practices for
MS33586	Metals, Definition of Dissimilar
MS33588	Nuts and Plate Nuts, Self-Locking, Aircraft Design and Usage Limitations of
MS33678	Connector, Receptacle, Electric, Integral Mounting

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

3. REQUIREMENTS:

3.1 Preproduction:

This specification makes provision for preproduction testing.

3.2 Data:

Unless otherwise specified in the contract or order, no data are required by this specification or any of the documents referenced in section 2 (see 6.2).

3.3 Components:

The ice detector assembly shall consist of no more than two separate components, an ice detector probe and an auxiliary equipment such as an amplifier or transformer.

3.4 Selection of specifications and standards:

Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

- 3.4.1 Standard parts: Standard parts (MS or AN) shall be used wherever they are suitable for the purpose, and shall be identified on the drawing by their part numbers. Commercial utility parts such as screws, bolts, nuts, cotter pins, etc., may be used, provided they possess suitable properties and are replaceable by the standard parts (MS or AN) without alterations, and provided the corresponding standard part numbers are referenced in the parts list and, if practicable, on the contractor's drawings. In the event there is no suitable corresponding standard part in effect on date of invitation for bids, commercial parts may be used provided they conform to all requirements of this specification.

3.5 Materials:

Materials shall conform to the applicable specifications specified herein. When materials are used that are not specifically designated, they shall be entirely suitable for the purpose.

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- 3.5.1 Metals: Metals shall be corrosion resistant or suitably treated to resist corrosion due to atmospheric and climatic conditions encountered during storage or service usage.
- 3.5.2 Dissimilar metals: Unless suitably protected against electrolytic corrosion, dissimilar metals as defined in MS33586 shall not be used in intimate contact with each other. Magnesium or magnesium alloys shall not be used.
- 3.5.3 Castings: Castings shall be clean, sound, and free from blowholes, porosity, cracks, and other defects.
- 3.5.4 Fungus-proof materials: Materials that are not nutrients for fungi shall be used to the greatest extent practicable. Where materials that are nutrients for fungi must be used, they shall be treated with a fungicidal agent approved by the procuring activity.
- 3.6 Design:
- The ice detector assembly shall be designed to:
- (a) Operate a warning device to indicate to the pilot when dangerous icing conditions are encountered.
 - (b) Transmit an electrical signal which can be used to control operation of the ice protection system.
- 3.6.1 Simplicity: The ice detector shall be as small as practicable, and shall not require periodic adjustment or calibration. It shall be simple to install and so designed that overhaul and repair can be accomplished easily without the use of special tools and fixtures.
- 3.6.2 Electric power: Electric power requirements for the ice detector shall conform to MIL-STD-704. Electric power required to conform to all other requirements of this specification shall be in accordance with category C of MIL-STD-704.
- 3.6.3 Radio interference: Interference control requirements shall be in accordance with MIL-I-6181.
- 3.6.4 Switching: The ice detector shall be capable of switching inductive external circuit having a potential up to the maximum specified in 3.6.2 and a steady-state power consumption of 30 watts.
- 3.6.5 Bonding: Bonding shall conform to MIL-B-5087.
- 3.6.6 Standard electronic parts: Electronic parts, and the application thereof, shall be in accordance with MIL-E-5400. The use of electronic tubes shall be avoided, wherever practicable.
- 3.6.7 Switches: Switches shall be in accordance with MIL-S-6743. Ice detectors incorporating electrical circuitry shall incorporate a checkout circuit to simulate ice or impending ice at the detector probe. The test switch shall enable the pilot to give the detector assembly a functional test during preflight inspection.

3.6.8 Contacts: Electrical contacts shall be made of silver or other suitable material approved by the procuring activity.

3.6.9 Explosion proofing: The equipment shall be explosion proof (see 4.5.10.10).

3.6.10 Temperature: Temperature ranges shall be:

- (a) Type I: The ice detector assembly shall be designed to sense accumulating ice throughout a range of -65° to +45°F.
- (b) Type II: The ice detector temperature-sensing element shall have an adjustable calibration range of 32° to 45°F to sense icing conditions. Icing shall be sensed from -65°F to the calibrated limit. The calibration setting shall be evident by permanent markings, in 2°F increments, at the location where the calibration is made. Unless otherwise specified, the calibration setting shall be set at 32°F prior to preproduction testing and shipment.

3.6.11 Thermal lag: If a temperature or thermostat probe is used, it shall be designed for minimum thermal lag.

3.7 Construction:

The ice detector assembly shall be so constructed that no parts will work loose in service. It shall withstand strains, jars, vibrations, damage from foreign objects, and other conditions incident to shipping, storage, installation, and service. Pivots, bearings, and gears shall not bind nor shake and shall be as nearly frictionless as possible. That portion of the ice detector that extends into the airstream shall present the least possible obstruction to flow and be constructed to withstand damage from ice particles that break away from the airframe.

3.8 Performance:

The ice detector shall satisfy the performance requirements specified herein, when subjected to the applicable tests in section 4.

3.9 Weight:

The weight of the ice detector assembly shall not exceed 3 pounds.

3.10 Electrical receptacle:

The ice detector assembly shall be provided with electrical receptacles in accordance with MIL-C-5015, class A, C, or E, and shall conform to MS33678.