



Designation: F3310 – 18

Standard Specification for Non-Essential Ice Detectors for Aircraft¹

This standard is issued under the fixed designation F3310; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This specification covers international standards for non-essential ice detection system aspects of airworthiness and design for aeroplanes.

1.2 The term “aeroplane” is utilized in this specification as it was originally conceived for normal category fixed wing aircraft with a certified maximum takeoff weight (MTOW) of 19 000 lb or less and a passenger seating configuration up to 19 as defined in the Rules. However, these standards may be more broadly applicable and their usage should not be unnecessarily limited.

1.3 The applicant for a design approval must seek the individual guidance of their respective CAA body concerning the use of this specification as part of a certification plan. For information on which CAA regulatory bodies have accepted this specification (in whole or in part) as a means of compliance to their Small Aircraft Airworthiness regulations (hereinafter referred to as “the Rules”), refer to ASTM F44 webpage (www.ASTM.org/COMMITTEE/F44.htm) which includes CAA website links. It is the responsibility of the Applicant to validate any applicability beyond that identified in this specification and request acceptance from the applicable CAA.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 Following is a list of external standards referenced throughout this specification; the earliest revision acceptable

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for use is indicated. In all cases later document revisions are acceptable if shown to be equivalent to the listed revision, or if otherwise formally accepted by the governing civil aviation authority; earlier revisions are not acceptable.

2.2 *ASTM Standards:*²

F3060 Terminology for Aircraft

F3061/F3061M Specification for Systems and Equipment in Small Aircraft

F3120/F3120M Specification for Ice Protection for General Aviation Aircraft

2.3 *Other Standards:*

SAE AS 5498 Issued 2001-10 Minimum Operational Performance Specification for Inflight Icing Detection System³

EUROCAE ED-103A Minimum Operational Performance Specification for Inflight Icing Detection Systems⁴

RTCA DO-160E Environmental Conditions and Test Procedures for Airborne Equipment⁵

3. Terminology

3.1 Refer to Terminology F3060.

3.2 *Definitions:*

3.2.1 *FIDS*—flight icing detection system.

3.2.2 *LWC*—liquid water content.

3.2.3 *non-essential ice detector*—an active or passive ice detector that does not receive certification credit for its installation.

4. Applicability

4.1 *Aircraft Level/Category*—The installation of a non-essential ice detector is limited to level 1, 2, 3 and 4 Aeroplanes defined in Specification F3061/F3061M and normal, utility, acrobatic, or commuter category Aeroplanes.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

³ Available from SAE International (SAE), 400 Commonwealth Dr., Warrendale, PA 15096, <http://www.sae.org>.

⁴ Available from The European Organisation for Civil Aviation Equipment (EUROCAE), 9-23 rue Paul Lafargue, “Le Triangle” building, 93200 Saint-Denis, France, <https://www.eurocae.net>.

⁵ Available from Radio Technical Commission for Aeronautics (RTCA), 1150 18th NW, Suite 910, Washington, DC 20036, <https://www.rtca.org>.

4.2 *Existing Ice Detection System*—The installation of a Non-essential ice detector as a replacement for or modification to an existing Primary or Advisory ice detection system is prohibited.

4.3 *Aircraft Certification Basis*—The aircraft icing certification basis determines which portions of this specification are applicable for a specific project. The requirements are defined in **Table 1**.

5. General Requirements

5.1 *Product Identification*—One of the major components of a non-essential ice detector system shall also be labeled with the following information:

- 5.1.1 Serial Number, and
- 5.1.2 Manufacturer’s Name.

5.2 *Operating Conditions*—The ice detection system manufacturer shall specify the following limitations for proper function:

- 5.2.1 Voltage operating range (min/max), if applicable,
- 5.2.2 Electrical load specifications, if applicable,
- 5.2.3 Restrictions regarding the use and application of deicing fluids with the system, if applicable.
- 5.2.4 Aircraft operating range and restrictions regarding: Speed, Temperature, altitude.
- 5.2.5 Environmental icing conditions and restrictions regarding: Specification **F3120/F3120M** Atmospheric Icing Conditions section.

5.3 *Installation Manual*—The manufacturer of the non-essential ice detection system shall provide an installation manual that specifies the following information so that an installer can determine appropriate use for an aircraft installation:

- 5.3.1 A full description of the intended function(s) of the system including the possible restrictions / limitations, referencing the FIDS FUNCTIONS defined within SAE AS 5498 or EUROCAE ED-103A Section 3.
- 5.3.2 An explicit compliance statement to this specification,
- 5.3.3 The operation limitations (including the items in 5.2, Operating Conditions),
- 5.3.4 The environmental conditions (including items in Section 7, Environmental Requirements),
- 5.3.5 Installation and calibration instructions required for proper operation of all intended functions of the system,

5.3.6 *Instructions for Continued Airworthiness*—The manufacturer of the Non-Essential ice detection system shall provide continued airworthiness procedures necessary to ensure safe and accurate operation (calibration, alignment to aircraft, maintenance, etc.).

5.3.7 A notice advising the installer that the icing indication must be placed within the pilot’s viewing area, but cannot obstruct the pilot’s view.

5.3.8 Installation location of markings and placards must be provided.

5.4 *User’s Manual*—The manufacturer of the non-essential ice detection system shall provide a user’s manual that specifies:

5.4.1 The functional operation of the system (including items in Section 6, Functional Requirements).

5.5 It is permissible that the Installation and User Manual be one document, so long as it clearly delineates the two sections.

6. Functional Requirements

6.1 *Intended Function:*

6.1.1 The intended function(s) shall be specified, referencing the FIDS FUNCTIONS defined within SAE AS 5498 or EUROCAE ED-103 Section 3, highlighting the possible deviations and adaptations made for the user.

6.1.2 The intended function shall be consistent with any existing AFM Limitations and Procedures.

6.2 *Performance:*

6.2.1 Compliance of the function(s) specified in 6.1.1 shall be demonstrated (taking into account declared deviations and adaptations) through test conditions of SAE AS 5498 or EUROCAE ED-103, “Minimum Operational Performance Specification for Inflight Icing Detection Systems.”

6.2.1.1 These characteristics shall be verified by test of a functionally equivalent system.

6.2.1.2 This test need not be representative of any particular aircraft installation and may be done in a wind tunnel, on an aircraft, or other testing method.

6.3 *Accessibility of Controls*—Adjustments not normally made during flight (for example, setup, calibration, etc.) shall not be accessible from the top-level user interface (that is, there must be a menu or special entry that requires a deliberate action to enter setup mode).

6.4 *Software*—If the system uses software, it shall function as described in the system’s user manual. The software configuration shall be controlled by the manufacturer.

6.4.1 If the device can have field loadable software, the revision shall reside on, or in, the product such that a user can view it.

7. Environmental Requirements

7.1 The system shall meet the following parameters specified by the manufacturer:

NOTE 1—Only the environmental and electrical requirements explicitly called out in this specification are required for non-essential ice detectors.

7.1.1 *Operating Temperature Range*—The temperature range throughout which the system functions as intended.

TABLE 1 Aircraft Icing Certification Basis

Airplane Classification	Icing Certification Basis	Sections Required
A	Aircraft not approved for operation in icing conditions	All except 8.2.3, 10.3
B	Aircraft approved for operation in icing conditions by virtue of ice protection equipment as part of the minimum required equipment list	All except 8.2.3, 10.3
C	Aircraft certified for flight in the icing conditions defined in 11.1 and 11.2 Specification F3120/F3120M	All