AEROSPACE STANDARD

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Superseding AS8014

Minimum Performance Standard Stall Warning Equipment

RATIONALE

This standard contains no changes from the previous version, other than the addition of a stabilization notice page. This document has been determined to contain stable technical information which is not dynamic in nature.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE A-4 Aircraft Instruments Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

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1. PURPOSE: This Aerospace Standard establishes the minimum performance requirements for Stall Warning Equipment.

2. SCOPE:

2.1 Definition: This Aerospace Standard covers two basic Stall Warning Systems, one measures air flow and pressure distribution on the airfoil and the other measures the angle of airflow with respect to an arbitrary reference line. Each type of system includes, as a minimum, a sensor and the means for activating a device which warns the pilot of an impending stall.

2.2 Sensor Category Usage: Sensors will be categorized for operation in either of the following:

Category A - For use on aircraft certified for flight into known icing conditions.

Category B - For use on aircraft not certified for flight into known icing conditions.

3. GENERAL STANDARDS:

3.1 Stall Warning Signal: The signal must be capable of continuously activating the warning device during conditions under which warning is required.

3.2 Interchangeability:

3.2.1 Systems and components which are identified with the same part number shall be completely interchangeable.

3.2.2 If the equipment components require matching for proper operation and to meet the requirements of this standard, they shall be identified in a manner which will assure proper matching. Installation instructions issued by the manufacturer shall indicate these matching requirements.

3.2.3 Aircraft Identification: The aircraft type and model number if applicable for which the Stall Warning Equipment has been calibrated and for which it performs its intended function, shall be clearly marked on the equipment nameplate and in the manufacturer's installation instructions. The TSO category shall also be identified (i.e., TSO-C54-A).

3.3 Adjustments: Adjustments which are not normally adjusted in flight shall not be readily accessible to flight personnel, when the equipment is installed in accordance with the equipment manufacturer's instructions.

3.4 Precipitation: The sensor shall be designed so that it will continue to function properly and give reliable stall warning during flight through rain of 150 mm/hr.

3.5 Drainage: Drain holes shall be provided for a sensor where necessary and such holes shall not result in any errors exceeding those specified in Paragraph 4.

3.6 Fire Resistance: Except for small parts (such as knobs, fasteners, seals, grommets, and small electrical parts) that would not contribute significantly to the propagation of a fire, all materials must be self-extinguishing when tested in accordance with the requirements of Federal Aviation Regulation 25.1359 (d) and Appendix F thereto, with the exception that materials tested may be configured in accordance with paragraph (b) of Appendix F or may be configured as used.

4. PERFORMANCE STANDARDS: Unless otherwise specified, all tests for performance may be conducted with the equipment (individual components) subjected to a vibration of 0.002 to 0.005 in. double amplitude at a frequency of 1500 to 2000 cycles/min to minimize friction.

4.1 Actuation Point: The Stall Warning Equipment must generate the Stall Warning Signal and shall sense the conditions which determine the actuation point consistent with the airframe manufacturer's stall data and to the equipment manufacturer's defined tolerances over the environmental range of the system. In the case of an airstream device, an accuracy in degrees is required, while in the case of a pressure distribution device a force accuracy will be required. The actuation point may be adjustable, in which case the manufacturer shall declare the range and tolerances to which the signal initiation point may be adjusted.

4.2 Sideslip: The Stall Warning Equipment must generate the Stall Warning Signal with the accuracy specified in Paragraph 4.1 under conditions of up to 5° of Yaw in each direction.

4.3 Electrical Power Monitor: Equipment which uses power to compute the stall warning actuation point must incorporate means to provide adequate power monitoring. When sufficient power is not available, to ensure proper operation of the equipment, the monitor shall provide, in a positive manner, a warning signal to indicate the power failure or malfunction.

4.4 Stall Warning Computer (If Applicable):

4.4.1 Aircraft Configuration: If compensation for aircraft configuration (flap extension, slats, etc.) change is necessary, the Computer must be capable of accepting signals from the Stall Warning Sensor (or computed signal from other sources) and other selected transmitters (Flap, Airspeed, Gear, etc.), and must provide an output for the Stall Warning signalling device with the accuracy specified in Paragraph 4.1. The Computer shall be designed so that a failure in it (with the exception of shorted wires on the input leads) will not adversely affect the operation of other devices which furnish signals to it.

4.4.2 Secondary Outputs: The Stall Warning Computer may have other outputs, that are derived within the Stall Warning Equipment; however, they must be sufficiently isolated from the Stall Warning Signal such that any failure modes of the secondary outputs do not affect the Stall Warning performance of Paragraph 4.1.

5. ENVIRONMENTAL CONDITIONS: The following tests are for qualification purposes and to demonstrate that the equipment is designed to meet these specifications.

5.1 Test Requirements: The following environmental tests shall be performed under the environmental conditions set forth in Radio Technical Commission for Aeronautics (RTCA) Document DO-160B, entitled, "Environmental Conditions and Test Procedures for Airborne Electronic/Electrical Equipment and Instruments", dated 20 July 1984. The order of tests must be in accordance with Paragraph 3.2, of DO-160B.

The test procedures specified or referenced are satisfactory for use in determining the performance of Stall Warning Equipment under normal and extreme environmental conditions. Alternate approved test procedures that provide equivalent results may be used. The manufacturer must specify the categorized limits for each of the following environments. The equipment must meet the performance standards in Paragraph 4 of this report under the environmental tests listed below:

a) Temperature - Altitude

b) Temperature Variation

c) Humidity

d) Shock

e) Vibration

f) Power Input

g) Voltage Spike Conducted