

**AIRSPPEED INSTRUMENTS**

**FOREWORD**

Changes in the revision are format/editorial only.

**1. SCOPE:**

**1.1 Types:**

This standard covers Airspeed Instruments which display airspeed of an aircraft, as follows:

- Type A - Air Driven, direct reading, self contained
- Type B - Electrically operated, self contained
- Type C - Electrically operated, input from a remote sensor

**1.2 Purpose:**

This standard establishes minimum performance standards for total and static pressure actuated airspeed instruments.

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### 2. APPLICABLE DOCUMENTS:

The following documents shall form a part of this specification to the extent specified herein:

- a. Radio Technical Commission for Aeronautics (RTCA) Document DO-160 "Environmental Conditions and Test Procedures for Airborne Electronic/Electrical Equipment and Instruments," dated 28 February 1975. (Copies may be obtained from the RTCA Secretariat, 1717 H Street N.W., Washington, D.C. 20006).
- b. NASA Technical Note D-822, Tables of Airspeed, Altitude, and Mach Number Based on International Values for Atmospheric Properties and Physical Constants, by Livingston and Gracey August 1961.

### 3. GENERAL REQUIREMENTS:

#### 3.1 Indicating Means:

The airspeed shall be indicated by means of a pointer, dial, tape, drum, or other type of moving element, or by a digital display. Unless otherwise specified, relative motion of the index with respect to the scale (either the index or the scale may be the moving element) must be clockwise, up, or to the right for increasing airspeed.

#### 3.2 Display:

3.2.1 Graduations: The graduations shall be arranged to provide the maximum readability consistent with the accuracy of the instrument. Graduations shall be as follows:

- a. The first graduation shall be at the lowest usable airspeed of the instrument, as specified by the manufacturer.
- b. From the 10 knot, 10 mph, or 20 km/h graduation nearest to the first graduation and continuing to 250 knots, 250 mph, or 400 km/h major graduations shall be at least every 10 knots, 10 mph, or 20 km/h, with minor graduations at least every 5 knots, 5 mph, or 10 km/h.
- c. Over 250 knots, 250 mph, or 400 km/h, graduations shall be at least every 50 knots, 50 mph, or 100 km/h.

3.2.2 Numerals: The display shall include sufficient numerals positioned to permit quick and positive identification of each graduation.

3.2.3 Instrument Identification: The instrument face shall be marked with "Airspeed" or "IAS" and also with the units of measure applicable to the instrument.

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- 3.2.4 Limits: The indicating means shall be limited in such a way that the moving element will not move more than (a) 10 degrees for circular display or (b) 0.25 in (6 mm) for linear displays beyond the greatest or least graduation in both increasing and decreasing directions.

For circular displays, positive means must be taken so that no ambiguity will exist when the indicator is at the maximum or minimum position, including the maximum overtravel of 10°. If a digital display is used a positive indication shall be provided on the display when the airspeed exceeds the instrument's calibrated range.

- 3.2.5 Visibility: The indicating means must be visible from all points within a space defined by a surface generated by lines making an angle of at least 30 degrees with the perpendicular to the display surface and diverging from the perimeter of the instrument window aperture. If integral lighting is provided, it must make all markings within the instrument easily readable, and not allow objectionable stray light to come from the instrument.

- 3.2.6 Range: The range of operation of the instrument shall be marked on the nameplate.

### 3.3 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 used must be self-extinguishing when tested in accordance with the requirements of Federal Aviation Regulation 25.139(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.

### 3.4 Self-Test Capability:

If the equipment contains integral arrangements to permit pre-flight and/or in-flight self-test checks on the operation of the equipment in combination with other aircraft subsystems, a means shall be provided to deactivate any subsystem which might be adversely affected during the self-test cycle. In flight, self-test activating controls must provide a means to warn the pilot of this mode of operation. Self-test provisions shall automatically return to the normal operation mode following self testing.

### 3.5 Compatibility of Components:

If instrument system components are individually acceptable but require matching for proper operation, they shall be identified on the equipment nameplate in a manner that will ensure proper matching.

### 3.6 Reflectance, Cover Glass:

The total reflectance of the instrument cover glass including the integral lighting wedge, if applicable, shall not exceed 10 percent of the incident light. This reflectance applies over the visible light spectrum from 450 milli-microns to 600 milli-microns, and over an incident solid angle of 60° perpendicular to the viewing plane.