

Minimum Performance Standard
for
Direction Instrument, Non-Magnetic (Gyroscopically Stabilized)

1. PURPOSE:

This Aerospace Standard (AS) defines minimum performance requirements under standard and environmental conditions for Gyroscopically Stabilized Non-Magnetic Direction Instruments for use in aircraft.

2. SCOPE:

This document establishes the minimum requirements for design and qualification of equipment identified as Gyroscopically Stabilized Non-Magnetic Direction Instruments.

3. GENERAL REQUIREMENTS:

3.1 Operation of Controls:

The operation of controls intended for use during flight, if any, in all possible position combinations and sequences shall not result in a condition whose presence or continuation would be detrimental to the continued performance of the equipment.

3.2 Accessibility of Controls:

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

3.3 Compatibility of Components:

If the equipment components require matching for proper operation, they shall be identified in a manner that will provide for proper matching. The instructions furnished by the manufacturer must contain data detailing these limitations.

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3.4 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 paragraph (b) of Appendix F or may be configured as used.

3.5 Interchangeability:

Instruments and components which are identified with the same manufacturer's part number shall be interchangeable.

3.6 Malfunction Indication:

Integral means shall be provided to indicate failures and/or the existence of the following conditions:

- (a) Gyro in fast erection mode, required of electrical instruments except manually caged indicators with automatic release.
- (b) Gyro operating at speed below the minimum designated by the manufacturer for the instrument to meet the performance requirements herein. The requirement applies to electrical and remotely operated instruments.

Additionally, the indicator or display of the repeating or remote indicating type of gyroscopically stabilized instrument shall be provided with means to indicate the following failures:

- (c) Loss of synchro excitation
- (d) A mechanical obstruction in the indicator dial drive mechanism
- (e) Primary power loss to the indicator or display
- (f) Servo Amplifier power loss
- (g) Electrical failure in the servo drive motor phases

The indicating means shall indicate the failure or malfunction in a positive and conspicuous manner.

3.7 Instrument Cover Glass Reflectance:

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 nanometers to 600 nanometers, and over an incident solid angle of 60 degrees perpendicular to the viewing plane.

3.8 Indicating Method:

One of the following methods of indication shall be employed:

Method I Rotating dial display with fixed datum line. The line shall rotate counter-clockwise for right turns.

Method II Horizontal scale display with fixed datum line. The graduations shall move to the left for right turns.

3.9 Operating Limits:

The instrument shall indicate heading throughout the 360 degree scale range. During dives, climbs, and banks of up to at least 55 degree displacement from level attitude, the instrument shall remain functional; however, the heading error involved through the gimbal system need not be corrected.

3.10 Dial Markings:

3.10.1 Graduations: The indicators shall be provided with degree graduations at intervals not to exceed five (5) degrees, with major graduations every ten (10) degrees and with numerals at intervals not greater than 30 degrees, except that the 0, 90, 180, and 270 degrees positions may be marked N, E, S, and W, respectively.

3.10.2 Visibility: Index and dial markings shall be visible from any point within the upper half of a frustum of a cone, the side of which makes an angle of at least 30 degrees with the perpendicular to the dial and the small diameter of which is the aperture of the instrument case. At least two numerals shall be simultaneously visible.

3.11 Caging Provisions:

Unless the gyro assembly has restricted freedom of operation in the pitch and roll axes, a means shall be provided for caging and/or releveing the gyro. A means shall be provided to indicate when the gyro is caged, except when it is not possible to leave the gyro in the caged condition.

3.12 Course Setting Provisions:

A means shall be provided for manually setting the directional indicator to any heading desired.