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**Bank and Pitch Instruments (Indicating Stabilized Type)
(Gyroscopic Horizon, Attitude Gyro)**

FOREWORD

This document has been declared "NONCURRENT". It is recommended, therefore, that this document not be specified for new designs. "NONCURRENT" refers to those documents which have previously been widely referenced and may continue to be required on some existing designs. "NONCURRENT" documents are available from SAE upon request.

1. PURPOSE:

To specify the minimum requirements for gyroscopically stabilized Bank and Pitch Indicating Instruments for use in aircraft, the operation of which may subject the instruments to the environmental conditions specified in Section 3.3.

2. SCOPE:

This Aeronautical Standard covers both direct and repeating type gyroscopically stabilized Bank and Pitch Indicating Instruments.

3. GENERAL REQUIREMENTS:

3.1 Material and Workmanship:

3.1.1 Materials: Materials shall be of a quality which experience and/or tests have demonstrated to be suitable and dependable for use in aircraft instruments.

3.1.2 Workmanship: Workmanship shall be consistent with high-grade aircraft instrument manufacturing practice.

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3.2 Identification:

The following information shall be legibly and permanently marked on the instrument or attached thereto:

- a. Name of Instrument
- b. Aeronautical Standard AS 396B
- c. Manufacturer's Part Number
- d. Manufacturer's Serial Number or Date of Manufacture
- e. Manufacturer's Name and/or Trade-Mark
- f. Rating (Electrical, Vacuum, Etc.)

3.3 Environmental Conditions:

The following conditions have been established as design requirements only. Tests shall be conducted as specified in Section 5, 6 and 7.

- 3.3.1 Temperature: When installed in accordance with the instrument manufacturer's instructions, the instrument shall function over the range of ambient temperatures shown in Column A below and shall not be adversely affected by exposure to the temperatures shown in Column B below:

<u>Instrument Location</u>	<u>A</u>	<u>B</u>
Heated Areas (Temperature Controlled)	-30 to 50C	-65 to 70C
Unheated Areas (Temperature Uncontrolled)	-55 to 70C	-65 to 70C

- 3.3.2 Humidity: The instrument shall function and shall not be adversely affected when exposed to any relative humidity in the range from 0 to 95% at a temperature of approximately 32C.

- 3.3.3 Vibration: When installed in accordance with the instrument manufacturer's instructions, the instruments shall function and shall not be adversely affected when subjected to vibrations of the following characteristics:

<u>Instrument Location in Airframe</u>	<u>Cycles Per Sec.</u>	<u>Max. Double Amplitude (Inches)</u>	<u>Max. Acceleration</u>
Power Plant Mounted	5 - 150	0.100	20g
Wings and Empennage	5 - 500	0.036	10g
Fuselage	5 - 500	0.036	5g
Panel or Rack (with Shockmounts)	5 - 50	0.020	1.5g

- 3.3.4 Altitude: The instrument shall function and shall not be adversely affected when subjected to a pressure and temperature range equivalent from -1000 feet to 40,000 feet standard altitude per NACA Report 1235, except as limited by application of Paragraph 3.3.1. The instrument shall not be adversely affected when subjected to a pressure of 50 in. Hg. absolute.

3.4 Radio Interference:

The instrument shall not be the source of objectionable interference, under operating conditions at any frequencies used on aircraft either by radiation or feed-back, in the radio equipment installed in the same aircraft as the instrument.

3.5 Magnetic Effect:

The magnetic effect of the instrument shall not adversely affect the operation of other instruments installed in the same aircraft.

4. DETAIL REQUIREMENTS:

4.1 Operating Range:

The instrument shall be operable following maneuvers of 360 degrees in bank and 360 degrees in pitch. Controlled precession may be employed to achieve the 360 degrees in pitch.

4.2 Methods of Display:

The method of displaying bank and pitch attitude shall be as specified below:

Bank attitude shall be displayed so that the true relationship between aircraft bank attitude and the actual earth's horizon is clearly presented over the range of indication.

Pitch attitude shall be displayed so that a change between the aircraft's pitch attitude and the actual earth's horizon is clearly presented in the proper relationship over the range of indication.

4.3 Indicating Requirements:

4.3.1 Indicating Range: The range of indication in pitch shall be at least plus or minus 25 degrees. The range of indication in bank shall be at least plus or minus 100 degrees.

4.3.2 Indicating Graduations: Right and left bank graduations shall at least be provided at 30 degrees.

4.3.3 Pitch Attitude Reference: A zero pitch reference shall be provided. An adjustable pitch reference marker or indicator may be provided to accommodate a range of pitch attitude trim.

4.3.4 Visibility and Parallax: Index and dial markings shall be visible from any point within the frustum of a cone the side of which makes an angle of not less than 30 degrees with the perpendicular to the dial and the small diameter of which is the aperture of the instrument case. Parallax error of the indicating elements shall be less than two degrees within a frustum of a cone the side of which makes an angle of 30 degrees with the perpendicular to the dial and the small diameter of which is the aperture of the instrument cone.