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Superseding AS408B

**Pressure Instruments - Fuel, Oil and Hydraulic
(Reciprocating Engine Powered Aircraft)**

FOREWORD

Changes in this Revision are format/editorial only.

1. SCOPE:

This Aeronautical Standard covers two basic types of fuel, oil and hydraulic pressure instruments as follows:

Type I - Direct Indicating
Type II - Remote Indicating

This Aerospace Standard does not apply to engine mounted torque meter systems.

1.1 Purpose:

This Aerospace Standard establishes the essential minimum safe performance standards for fuel, oil and hydraulic pressure instruments primarily for use with reciprocating engine powered transport aircraft, the operation of which may subject the instruments to the environmental conditions specified in Section 3.3.

2. REFERENCES:

NACA Report 1235

3. GENERAL REQUIREMENTS:

3.1 Materials 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.

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

3.2 Identification:

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

- a. Name of instrument
- b. SAE AS408C
- c. Manufacturer's part number
- d. Manufacturer's serial number or date of manufacture
- e. Manufacturer's name and/or trademark
- f. Range
- g. Rating (Electrical, vacuum, etc.)
- h. Explosion category

3.3 Environmental Conditions:

The following conditions have been established as minimum design requirements. Tests shall be conducted as specified in Sections 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 temperature shown in Column A below and shall not be adversely affected by exposure to the range of temperature shown in Column B below:

TABLE 1

<u>Instrument Location</u>	<u>A</u>	<u>B</u>
Power Plant Compartment	-30 to +100 °C	-65 to +100 °C
Heated Areas (Temperature Controlled)	-30 to +70 °C	-65 to +70 °C
Unheated Areas (Temperature Controlled)	-55 to +70 °C	-65 to +70 °C
Power Plant Accessory Compartment	-30 to +100 °C	-65 to +100 °C

- 3.3.2 Altitude: When installed in accordance with the instrument manufacturer's instructions, the instruments shall function and shall not be adversely affected following exposure to a pressure and temperature range equivalent to -1000 to 40,000 feet standard altitude, per NACA Report 1235, except as limited by the application of Paragraph 3.3.1. The instrument shall not be adversely affected when subjected to an ambient pressure of 50 inches of mercury absolute.
- 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:

TABLE 2

<u>Instrument Location in Airframe</u>	<u>Cycles per Second</u>	<u>Maximum Double Amplitude (Inches)</u>	<u>Maximum Acceleration</u>
Power Plant Mounted	5-150	0.100	20 g
Wings and Empennage	5-500	0.036	10 g
Fuselage	5-500	0.036	5 g
Panel or Rack (Vibration Isolated)	5-50	0.020	1.5 g

- 3.3.4 Humidity: The instruments 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 +70 °C.
- 3.4 Explosion Category:

The instrument component, when intended for installation either in uninhabited areas of non-pressurized aircraft or in non-pressurized areas of pressurized aircraft, shall not cause an explosion when operated in an explosive atmosphere. The component shall meet the requirements applicable to the explosion category below. Specifically, any instrument component which can be an ignition source and is intended for installation in an area in which combustible fluid or vapor may result from abnormal conditions, e.g., fuel line leakage, shall meet the requirements of Category I. If the intended location is an area where combustible fluid or vapor can occur during normal operation, e.g., fuel tank, the instrument component shall meet the requirements of Category II listed below:

TABLE 3

<u>Category</u>	<u>Definition</u>	<u>Requirement</u>
I	Explosion proofed: Case not designed to preclude flame or explosion propagation	Paragraph 7.11.1
II	Explosion proofed: Case designed to preclude flame or explosion propagation	Paragraph 7.11.2
III	Hermetically sealed	Paragraph 6.6
IV	Instrument not capable of causing an explosion	Shall not be capable of producing a capacitive or inductive spark of more than 0.2 millijoules of energy or a contact spark of more than 4.0 millijoules of energy.

3.5 Fire Hazard:

The instruments shall be so designed to safeguard against hazards to the aircraft in the event of malfunction or failure, and the maximum operating temperature of surfaces of any instrument component, whether functioning correctly or malfunctioning, contacted by combustible fuel or vapor shall not exceed +200 °C due to self-heating.

3.6 Radio Interference:

The instruments shall not be the source of objectionable interference, under operating conditions at any frequencies used on aircraft, either by radiation or feedback, in electronic equipment installed in the same aircraft as the instruments.

3.7 Magnetic Effect:

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

3.8 Suction or Overpressure:

Pressure or suction instruments, as applicable, shall not be adversely affected when subjected to suction or overpressure as specified in the following table:

TABLE 4

<u>Maximum Indicated Pressure - PSI</u>	<u>Overpressure</u>		<u>Suction</u>
	<u>Percent of Maximum Indicated Pressure</u>		<u>Percent of Maximum Suction</u>
	<u>Oil & Hydraulic</u>	<u>Fuel</u>	<u>Fuel Vent</u>
0 to 200	200	120	135
201 to 1000	150		
1001 to 2000	133		
2001 up	125		

3.9 De-Compression:

When installed in accordance with the instrument manufacturer's instructions the instrument shall function and not be adversely affected following exposure to a pressure decrease from 22 to 2 inches of mercury in 2 seconds.

4. DETAIL REQUIREMENTS:

4.1 Indicating Means:

The pressure instrument shall indicate by means of a visual display such as pointer(s) moving over a fixed dial, digital counter, etc.

- 4.1.1 Finish: Unless otherwise specified by the user, matte white material shall be applied to all graduations, numerals, pointers and indication means.

Non-functional surfaces and markings shall be durable dull black.

- 4.1.2 Graduations: The graduations shall be arranged to provide the maximum of readability consistent with the accuracy of the instrument.

- 4.1.3 Numerals: The display shall include sufficient numerals to permit quick and positive identification of each graduation. Numerals shall distinctly indicate the graduation to which each applies.