



AEROSPACE STANDARD

AS 8028

Society of Automotive Engineers, Inc.

400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

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Revised

POWERPLANT FIRE DETECTION INSTRUMENTS

A-27-05

THERMAL & FLAME CONTACT TYPES

(RECIPROCATING AND TURBINE ENGINE POWERED AIRCRAFT)

1.0 PURPOSE

This Standard establishes minimum requirements for powerplant fire detection instruments primarily for use in reciprocating and turbine engine powered aircraft.

2.0 SCOPE

2.1 This Standard covers the following basic types of fire detection instruments, or combinations thereof, intended for use in protecting aircraft powerplant installation, auxiliary powerplants, combustion heaters and other installations where fuel, oil or similar fires may occur.

2.2 Types

Type I: Thermal - Fixed Temperature, an instrument which will actuate an alarm signal when exposed to any temperature above a definite pre-established level.

Type II: Thermal - Rate of Rise, an instrument which will actuate an alarm signal when exposed to any rate of temperature change above a definite pre-established level.

Type III: Flame - Contact, an instrument which will actuate an alarm signal when exposed to physical contact with flame.

2.3 Range

The range and/or setting of the instrument shall be as marked on the instrument.

2.4 Applicable Documents

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

Radio Technical Commission of 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 RTCS Secretariat, 1717 H Street, N.W. Washington, D.C. 20006).

"Rules for SAE use of SI (metric) units - SAE document J 916B," dated July 1976 - Copies may be obtained from Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA., 15096.

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3.0 GENERAL STANDARDS

- 3.1 Materials: Materials shall be of a quality which experience and/or tests have demonstrated to be suitable and dependable for use in aircraft instruments.
- 3.2 Workmanship: Workmanship shall be consistent with high-grade aircraft instrument manufacturing practice.
- 3.3 Accessibility of Controls: Controls which are not normally adjustable in flight shall not be readily accessible to flight personnel when the instrument is installed in accordance with the manufacturer's instructions.
- 3.4 Interchangeability: Instruments which are identified with the same manufacturer's part or model number range and/or setting shall be completely interchangeable.
- 3.5 Integrity Test Means: The instrument shall be of such design to provide a means for testing the integrity of the instrument when the aircraft engines are operating.
- 3.6 Identification: The following information shall be legibly and permanently marked on the instrument or attached thereto:

- (a) Name of Instrument (Powerplant Fire Detector)
- (b) Manufacturer's Part Number
- (c) Manufacturer's Serial Number or Date of Manufacture
- (d) Manufacturer's Name and/or Trademark
- (e) Type Number
- (f) Alarm Temperature or range (Sensing element, where applicable)
- (g) Rating (Electrical, Vacuum, etc.)

- 3.7 Environmental Conditions: The following conditions have been established as minimum design requirements.

- 3.7.1 Temperature: When installed in accordance with the manufacturer's recommendations, 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 (deg. C)</u>	<u>A (deg. F)</u>	<u>B (deg. C)</u>	<u>B (deg. F)</u>
Powerplant Compartments	-55 to 150	-67 to 302	-65 to 150	-85 to 302
Pressurized Areas	-30 to 50	-22 to 122	-65 to 70	-85 to 158
Non pressurized or External areas	-55 to 70	-67 to 158	-65 to 70	-85 to 158

If instrument is intended for use in compartments where ambient exceeds range limits noted in Columns A or B appropriate special limits shall be selected for Columns A and B, and specified by the manufacturer.

- 3.7.2 Humidity: The instrument shall function and shall not be adversely affected when exposed to a relative humidity in excess of 95 percent

3.7.3 Altitude: When installed in accordance with the instrument manufacturer's instructions, the instruments shall function from sea level up to the altitudes and temperatures listed below. Altitude pressures are per U.S. Standard Atmosphere, 1962.

<u>Instrument Location</u>	<u>Altitude</u>		<u>Temperature</u>	
	<u>Ft.</u>	<u>M</u>	<u>°C</u>	<u>°F</u>
Powerplant Compartments	50,000	15,240	80	176
Other Areas	50,000	15,240	50	122

The instrument shall not be adversely affected following exposure to extremes in ambient pressure of 50 in. (127 cm), and 3 in. (7.62 cm) of mercury absolute, respectively.

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

<u>Reciprocating Engines</u>	<u>Frequency Cycles Per Sec.</u>	<u>Max. Double Amplitude</u>		<u>Maximum Acceleration</u>
		<u>In.</u>	<u>Cm</u>	
Airframe Structure Mounted	5-500	.050	.127	10g
Shock-Mounted Panel	5-50	.020	.051	1.5g
Powerplant Mounted	5-500	.100	.254	20g
<u>Turbine Engines</u>	<u>Frequency Cycles Per Sec.</u>	<u>Max. Double Amplitude</u>		<u>Maximum Acceleration</u>
		<u>In.</u>	<u>Cm</u>	
Nacelle and Nacelle Mounts, Wings, Empennage and Wheel Wells	5-2000	0.036	.091	10g
Fuselage				
Forward of Spar Area	5-500	0.036	.091	2g
Center of Spar Area	5-1000	0.036	.091	4g
Aft of Spar Area	5-500	0.036	.091	7g
	500-1000	-----	----	5g
Vibration Isolated	5-50	0.020	.051	1.5g
Racks	50-500	-----	----	0.5g
Instrument Panel	5-500	.030	.076	1.0g

3.8 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 feedback, in electronic equipment installed in the same aircraft as the instrument.