

can be electrically connected to equipment other than that used for engine starting, means must be provided to ensure that no external power supply having a reverse polarity, or a reverse phase sequence, can supply power to the airplane's electrical system. The external power connection must be located so that its use will not result in a hazard to the airplane or ground personnel.

(g) It must be shown by analysis, tests, or both, that the airplane can be operated safely in VFR conditions, for a period of not less than five minutes, with the normal electrical power (electrical power sources excluding the battery and any other standby electrical sources) inoperative, with critical type fuel (from the standpoint of flameout and restart capability), and with the airplane initially at the maximum certificated altitude. Parts of the electrical system may remain on if—

(1) A single malfunction, including a wire bundle or junction box fire, cannot result in loss of the part turned off and the part turned on; and

(2) The parts turned on are electrically and mechanically isolated from the parts turned off.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13096, Aug. 13, 1969; Amdt. 23-14, 38 FR 31824, Nov. 19, 1973; Amdt. 23-17, 41 FR 55465, Dec. 20, 1976; Amdt. 23-20, 42 FR 36969, July 18, 1977; Amdt. 23-34, 52 FR 1834, Jan. 15, 1987; 52 FR 34745, Sept. 14, 1987; Amdt. 23-43, 58 FR 18976, Apr. 9, 1993; Amdt. 23-49, 61 FR 5169, Feb. 9, 1996]

§ 23.1353 Storage battery design and installation.

(a) Each storage battery must be designed and installed as prescribed in this section.

(b) Safe cell temperatures and pressures must be maintained during any probable charging and discharging condition. No uncontrolled increase in cell temperature may result when the battery is recharged (after previous complete discharge)—

(1) At maximum regulated voltage or power;

(2) During a flight of maximum duration; and

(3) Under the most adverse cooling condition likely to occur in service.

(c) Compliance with paragraph (b) of this section must be shown by tests un-

less experience with similar batteries and installations has shown that maintaining safe cell temperatures and pressures presents no problem.

(d) No explosive or toxic gases emitted by any battery in normal operation, or as the result of any probable malfunction in the charging system or battery installation, may accumulate in hazardous quantities within the airplane.

(e) No corrosive fluids or gases that may escape from the battery may damage surrounding structures or adjacent essential equipment.

(f) Each nickel cadmium battery installation capable of being used to start an engine or auxiliary power unit must have provisions to prevent any hazardous effect on structure or essential systems that may be caused by the maximum amount of heat the battery can generate during a short circuit of the battery or of its individual cells.

(g) Nickel cadmium battery installations capable of being used to start an engine or auxiliary power unit must have—

(1) A system to control the charging rate of the battery automatically so as to prevent battery overheating;

(2) A battery temperature sensing and over-temperature warning system with a means for disconnecting the battery from its charging source in the event of an over-temperature condition; or

(3) A battery failure sensing and warning system with a means for disconnecting the battery from its charging source in the event of battery failure.

(h) In the event of a complete loss of the primary electrical power generating system, the battery must be capable of providing at least 30 minutes of electrical power to those loads that are essential to continued safe flight and landing. The 30 minute time period includes the time needed for the pilots to recognize the loss of generated power and take appropriate load shedding action.

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