

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N 8900.44

National Policy

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SUBJ: Equipment Necessary for Safe Emergency Operation of Single Engine Passenger Carrying Aircraft under IFR Section 135.163 (f)(2)

1. Purpose of This Notice. This notice provides guidance and information to aviation safety inspectors (ASI) who are responsible for Title 14 of the Code of Federal Regulations (14 CFR) part 135 certificate holders who operate single-engine passenger carrying airplanes under instrument flight rules (IFR). This guidance will help inspectors determine the minimum equipment necessary for the safe operation of an aircraft to continue to a landing in the event it becomes necessary to deactivate electrical items in order to comply with part 135, § 135.163(f)(2).

2. Audience. The primary audience for this notice is Flight Standards District Office (FSDO) ASIs who have oversight responsibilities for part 135 certificate holders. The secondary audience includes Flight Standards branches and divisions in the regions and in headquarters.

3. Where You Can Find This Notice. Inspectors can access this notice through the Flight Standards Information Management System (FSIMS) at <http://fsims.avs.faa.gov>. Operators and the public may find this information at: <http://fsims.faa.gov>.

4. Background.

a. Part 23, § 23.1353(h) requires that: “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 a 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.”

b. Section 135.163 specifies equipment requirements for aircraft carrying passengers under IFR and § 135.163 subparagraph (f) requires that single-engine aircraft have:

(1) Two independent electrical power generating sources each of which is able to supply all probable combinations of continuous inflight electrical loads for required instruments and equipment; or

(2) In addition to the primary electrical power generating source, a standby battery or an alternate source of electric power that is capable of supplying 150 percent of the electrical loads

of all required instruments and equipment necessary for safe emergency operation of the aircraft for at least one hour.

c. It has come to the attention of the Air Transportation Division, AFS-200 that some inspectors are not aware of the differences in power requirements between the two regulatory parts and have erroneously concluded that an aircraft certified under part 23 meets the requirements of part 135. However, the power requirements are significantly different. Under part 23, the battery need only power loads that are essential to continue safe flight and landing for 30 minutes. Under part 135, the battery must power 150 percent of that same load for 60 minutes.

5. Discussion.

a. Whenever an operator applies for a part 135 operating certificate using single-engine aircraft or desires to add single-engine aircraft to an existing certificate, the principal inspectors (PI) involved must determine if that aircraft meets the requirements of § 135.163(f). It is unrealistic to assume that if one component of an electrical system fails, that the remaining power sources could power the load of an entire aircraft, nor can we expect it to power everything required by 14 CFR part 91, § 91.205. Because of this, it may be necessary to reduce the aircraft's electrical draw. In this case, it is incumbent upon the operator to present to the PIs a plan to shed electrical items to comply with the rule. This notice is intended to provide guidance to the PIs to help determine the minimum equipment necessary for safe emergency operation of the aircraft for at least one hour without requiring specialized skills of the pilot.

b. The first thing an inspector should consider is the intended operation of the aircraft and the operations for which it is certificated as it will be necessary to plan for the worst possible situation the aircraft may encounter. For example, if the aircraft is certificated for operation in icing conditions, it will be necessary for all anti-ice/deice equipment to remain operational. If aircraft is not to be operated in icing, but is certificated for IFR flight, it will still be necessary to plan on the pilot heat being used continuously because the aircraft could be in visible moisture with an outside air temperature at or below 40° F or 5° C without accumulating ice. Visible moisture could be clouds, fog/mist with visibility of one mile or less, rain, sleet or ice crystals. Heated static ports, however, could be turned off if there were an Aircraft Flight Manual approved alternate static source such as breaking an instrument glass. Consideration of the worst case scenario must also include night operations. Thus, in addition to the above items, minimum safe emergency equipment would also include the following:

- (1) Engine instruments appropriate to the aircraft.
- (2) Primary flight instruments or one primary flight display (PFD).
- (3) Sufficient lighting to illuminate primary flight instruments or PFDs. This could be individual instrument lights or a cabin light, or in the case of flat panel displays, they could be self illuminating. These lights must be permanently installed in the aircraft; a portable light such as a flashlight is not acceptable.
- (4) One permanently installed communication radio.

- (5) One permanently installed approved means of navigation.
- (6) Full-authority digital electronic control or electronic engine control if installed.
- (7) Autopilot if single pilot operation.
- (8) Exterior lighting (see section c(2) below).
- (9) Fuel pump, unless it is only required intermittently such as for takeoffs and landings or when changing fuel tanks.
- (10) Equipment cooling fan, if applicable.

c. The following items are considered desirable, but may be downloaded if necessary to achieve required load limits. However, before approving a procedure in which these items must be turned off, the PIs should ensure that the operator has made every effort to upgrade the aircraft's electrical system. This could include, but is not limited to installing a larger capacity battery and/or light-emitting diodes (LED) position/strobe lights, if these items are available for the model aircraft being considered.

(1) Part 91, § 91.215 outlines the requirement for transponder equipment and use. However subparagraph d discusses air traffic control authorized deviations, so operations can continue without a transponder. There has been some discussion as to whether a composite aircraft will show up on radar; however, research by AFS-200 has concluded that the mass of the engine alone is enough to generate a primary return on radars currently in use in the National Airspace System.

(2) Section 91.205 requires aircraft to have an anticollision light system and position lights for night operation. This paragraph also allows the anticollision light system to be turned off for safety of flight reasons. If the system becomes inoperative, operations may continue to a stop where repairs or replacement can be made so there is precedent for operating without a lighting system required in § 91.205. It is not the FAA's intent to create a hazardous situation as a result of an unrelated abnormality, and since we must assume a night operation, some form of external lighting will be required. It is suggested that the PI determine which lighting system provides the most illumination or visibility, position lights, rotating beacon or strobes, and require that system in the load shedding procedure. As mentioned in a previous paragraph, the operator should consider converting to an LED lighting system if available. These lights consume considerably less power than conventional lights and if used, will provide all the lighting required by § 91.205 and still enable the operator to comply with § 135.163(f).

d. When considering a load shedding procedure, PIs can also make allowances for specific situations. For example, if an aircraft is in solid instrument meteorological conditions (IMC), the pitot heat probably needs to be on but all external lights could be turned off. On the other hand, if the aircraft is being operated in visual meteorological conditions or is operating during the day, then the pitot heat and position lights could be turned off and the beacon/strobe lights and transponder could be used.

e. Section 135.163(i) states that for the purpose of satisfying § 135.163(f), only items that draw power continuously during flight need to be considered when calculating load requirements, and occasional intermittent loads need not be included. Therefore such items as a landing gear extension, a landing light turned on just prior to landing, flap extension, or a fuel pump that is not needed continuously, may be omitted in calculating requirements for § 135.163(f). Operators should be aware, however, that extended operation on standby battery power may leave the battery drained to the point that there is not enough power available for some of these items when it comes time to land. Therefore, once the power failure occurs, a landing at the nearest suitable airport must be considered.

f. Items that are considered unnecessary for safe emergency operation of the aircraft include, but are not limited to things such as air conditioning, stormscope/weather radar, air phones, passenger entertainment systems, passenger cabin/reading lights, multifunction display if navigation information can be presented elsewhere, clocks, fuel quantity gauges, audio panel if the communication radio can feed directly into a headset, trim servos if not required for the autopilot, and redundant navigation/communication systems, etc.

6. Action.

a. ASIs will review this notice and provide a copy to each certificate holder operating or applying to operate a single engine, passenger carrying aircraft IFR under part 135. If it is determined the aircraft's backup electrical system does not meet the requirements of § 135.163(f), then that operator must present for approval a procedure for shedding electrical loads to bring the aircraft into compliance. This procedure must be incorporated into the Pilot Operating Handbook in the form of an emergency or abnormal operating procedures checklist.

b. Furthermore, once agreed upon, PIs should require that these procedures also be incorporated into the operator's approved training and checking program and ensure that all pilots are thoroughly familiar with the operation of the aircraft under the conditions outlined herein.

7. Disposition. We will not incorporate the information in this notice in FSIMS. Direct questions concerning this notice to Anthony Houston at the Part 135 Air Carrier Operations Branch, AFS 250, at (202) 267-8166.

ORIGINAL SIGNED by

James J. Ballough
Director, Flight Standards Service