(h) Except as provided in paragraph (i) of this section, and except for recorded data erased as authorized in this paragraph, each certificate holder shall keep the recorded data prescribed by this section, as appropriate, until the airplane has been operated for at least 25 hours of the operating time specified in §121.359(a) of this part. A total of 1 hour of recorded data may be erased for the purpose of testing the flight recorder or the flight recorder system. Any erasure made in accordance with this paragraph must be of the oldest recorded data accumulated at the time of testing. Except as provided in paragraph (i) of this section, no record need be kept more than 60 days.

(i) In the event of an accident or occurrence that requires immediate notification of the National Transportation Safety Board under 49 CFR 830 of its regulations and that results in termination of the flight, the certificate holder shall remove the recorder from the airplane and keep the recorder data prescribed by this section, as appropriate, for at least 60 days or for a longer period upon the request of the Board or the Administrator.

(j) Each flight data recorder system required by this section must be installed in accordance with the requirements of §25.1459 (a), (b), (d), and (e) of this chapter. A correlation must be established between the values recorded by the flight data recorder and the corresponding values being measured. The correlation must contain a sufficient number of correlation points to accurately establish the conversion from the recorded values to engineering units or discrete state over the full operating range of the parameter. Except for airplanes having separate altitude and airspeed sensors that are an integral part of the flight data recorder system, a single correlation may be established for any group of airplanes—

(1) That are of the same type;

(2) On which the flight recorder system and its installation are the same; and

(3) On which there is no difference in the type design with respect to the installation of those sensors associated with the flight data recorder system. Documentation sufficient to convert recorded data into the engineering units and discrete values specified in the applicable appendix must be maintained by the certificate holder.

(k) Each flight data recorder required by this section must have an approved device to assist in locating that recorder under water.

(l) The following airplanes that were manufactured before August 18, 1997 need not comply with this section, but must continue to comply with applicable paragraphs of §121.343 of this chapter, as appropriate:

(1) Airplanes that meet the State 2 noise levels of part 36 of this chapter and are subject to §91.801(c) of this chapter, until January 1, 2000. On and after January 1, 2000, any Stage 2 airplane otherwise allowed to be operated under Part 91 of this chapter must comply with the applicable flight data recorder requirements of this section for that airplane.

(2) British Aerospace 1–11, General Dynamics Convair 580, General Dynamics Convair 600, General Dynamics Convair 640, deHavilland Aircraft Company Ltd. DHC–7, Fairchild Industries FH 227, Fokker F–27 (except Mark 50), F–28 Mark 1000 and Mark 4000, Gulfstream Aerospace G–159, Jetstream 4100 Series, Lockheed Aircraft Corporation Electra 10–A, Lockheed Aircraft Corporation Electra 10–B, Lockheed Aircraft Corporation Electra 10–E, Lockheed Aircraft Corporation Electra L–188, Lockheed Martin Model 382 (L–100) Hercules, Maryland Air Industries, Inc. F27, Mitsubishi Heavy Industries, Ltd. YS–11, Short Bros. Limited SD3–30, Short Bros. Limited SD3–60.

[Doc. No. 28109, 62 FR 38378, July 17, 1997; 62 FR 48135, Sept. 12, 1997, as amended by Amdt. 121–300, 68 FR 42936, July 18, 2003; 68 FR 50069, Aug. 20, 2003]

§121.344a Digital flight data recorders for 10–19 seat airplanes.

(a) Except as provided in paragraph (f) of this section, no person may operate under this part a turbine-engine-powered airplane having a passenger seating configuration, excluding any required crewmember seat, of 10 to 19 seats, that was brought onto the U.S. register after, or was registered outside the United States and added to the operator's U.S. operations specifications

after, October 11, 1991, unless it is equipped with one or more approved flight recorders that use a digital method of recording and storing data and a method of readily retrieving that data from the storage medium. On or before August 20, 2001, airplanes brought onto the U.S. register after October 11, 1991, must comply with either the requirements in this section or the applicable paragraphs in §135.152 of this chapter. In addition, by August 20, 2001.

(1) The parameters listed in §§121.344(a)(1) through 121.344(a)(18) of this part must be recorded with the ranges, accuracies, and resolutions specified in Appendix B of part 135 of this chapter, except that—

(i) Either the parameter listed in §121.344 (a)(12) or (a)(15) of this part must be recorded; either the parameters listed in §121.344(a)(13) or (a)(16) of this part must be recorded; and either the parameter listed in §121.344(a)(14) or (a)(17) of this part must be recorded.

(ii) For airplanes with more than two engines, the parameter described in §121.344(a)(18) of this part must also be recorded if sufficient capacity is available on the existing recorder to record that parameter;

(iii) Parameters listed in §§121.344(a)(12) through 121.344(a)(17) of this part each may be recorded from a single source;

(iv) Any parameter for which no value is contained in Appendix B of part 135 of this chapter must be recorded within the ranges, accuracies, and resolutions specified in Appendix M of this part.

(2) Commensurate with the capacity of the recording system (FDAU or equivalent and the DFDR), the parameters listed in §§121.344(a)(19) through 121.344(a)(22) of this part also must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix B of part 135 of this chapter.

(3) The approved flight recorder required by this section must be installed as soon as practicable, but no later than the next heavy maintenance check or equivalent after August 18, 1999. A heavy maintenance check is considered to be any time an airplane is scheduled to be out of service for 4 more days and is scheduled to include access to major structural components.

(b) For a turbine-engine-powered airplanes having a passenger seating configuration, excluding any required crewmember seat, of 10 to 19 seats, that are manufactured after August 18, 2000.

(1) The parameters listed in §§121.344(a)(1) through 121.344(a)(57) of this part, must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this part.

(2) Commensurate with the capacity of the recording system, all additional parameters listed in §121.344(a) of this part for which information sources are installed and which are connected to the recording system, must be recorded within the ranges, accuracies, resolutions, and sampling intervals specified in Appendix M of this part by August 20, 2001.

(c) For all turbine-engine-powered airplanes having a passenger seating configuration, excluding any required crewmember seats, of 10 to 19 seats, that are manufactured after August 19, 2002, the parameters listed in §121.344(a)(1) through (a)(88) of this part must be recorded within the ranges, accuracies, resolutions, and recording intervals specified in Appendix M of this part.

(d) Each flight data recorder system required by this section must be installed in accordance with the requirements of §23.1459 (a), (b), (d), and (e) of this chapter. A correlation must be established between the values recorded by the flight data recorder and the corresponding values being measured. The correlation must contain a sufficient number of correlation points to accurately establish the conversion from the recorded values to engineering units or discrete state over the full operating range of the parameter. A single correlation may be established for any group of airplanes—

(1) That are of the same type;

(2) On which the flight recorder system and its installation are the same; and

(3) On which there is no difference in the type design with respect to the installation of those sensors associated with the flight data recorder system.

Correlation documentation must be maintained by the certificate holder.

(e) All airplanes subject to this section are also subject to the requirements and exceptions stated in §§ 121.344(g) through 121.344(k) of this part.

(f) For airplanes that were manufactured before August 18, 1997, the following airplane types need not comply with this section, but must continue to comply with applicable paragraphs of § 135.152 of this chapter, as appropriate: Beech Aircraft–99 Series, Beech Aircraft 1300, Beech Aircraft 1900C, Construcciones Aeronauticas, S.A. (CASA) C–212, deHavilland DHC–6, Dornier 228, HS–748, Embraer EMB 110, Jetstream 3101, Jetstream 3201, Fairchild Aircraft SA–226, Fairchild Metro SA–227.

[Doc. No. 28109, 62 FR 38380, July 17, 1997; 62 FR 48135, Sept. 12, 1997; 62 FR 65202, Dec. 11, 1997, as amended by Amdt. 121–300, 68 FR 42936, July 18, 2003]

§ 121.345 Radio equipment.

(a) No person may operate an airplane unless it is equipped with radio equipment required for the kind of operation being conducted.

(b) Where two independent (separate and complete) radio systems are required by §§ 121.347 and 121.349, each system must have an independent antenna installation except that, where rigidly supported nonwire antennas or other antenna installations of equivalent reliability are used, only one antenna is required.

(c) ATC transponder equipment installed within the time periods indicated below must meet the performance and environmental requirements of the following TSO's:

(1) *Through January 1, 1992:* (i) Any class of TSO-C74b or any class of TSO-C74c as appropriate, provided that the equipment was manufactured before January 1, 1990; or

(ii) The appropriate class of TSO-C112 (Mode S).

(2) *After January 1, 1992:* The appropriate class of TSO-C112 (Mode S). For purposes of paragraph (c) (2) of this section, ''installation'' does not include—

(i) Temporary installation of TSO-C74b or TSO-C74c substitute equipment, as appropriate, during maintenance of the permanent equipment;

(ii) Reinstallation of equipment after temporary removal for maintenance; or

(iii) For fleet operations, installation of equipment in a fleet aircraft after removal of the equipment for maintenance from another aircraft in the same operator's fleet.

[Doc. No. 6258, 29 FR 19205, Dec. 31, 1964, as amended by Amdt. 121–101, 37 FR 28499, Dec. 27, 1972; Amdt. 121–190, 52 FR 3391, Feb. 3, 1987]

§ 121.347 Radio equipment for operations under VFR over routes navigated by pilotage.

(a) No person may operate an airplane under VFR over routes that can be navigated by pilotage, unless it is equipped with the radio equipment necessary under normal operating conditions to fulfill the following:

(1) Communicate with at least one appropriate ground station from any point on the route.

(2) Communicate with appropriate traffic control facilities from any point within the lateral boundaries of the surface areas of Class B, Class C, Class D, or Class E airspace designated for an airport in which flights are intended.

(3) Receive meteorological information from any point en route by either of two independent systems. One of the means provided to comply with this subparagraph may be used to comply with paragraphs (a)(1) and (2) of this section.

(b) No person may operate an airplane at night under VFR over routes than can be navigated by pilotage unless that airplane is equipped with the radio equipment necessary under normal operating conditions to fulfill the functions specified in paragraph (a) of this section and to receive radio navigational signals applicable to the route flown, except that a marker beacon receiver or ILS receiver is not required.

[Doc. No. 6258, 29 FR 19205, Dec. 17, 1964, as amended by Amdt. 121–226, 56 FR 65663, Dec. 17, 1991