



Technical Standard Order

Subject: TSO-C124a, FLIGHT DATA RECORDER SYSTEMS

a. Applicability.

(1) Minimum Performance Standard. This technical standard order (TSO) prescribes the minimum performance standard that flight data recorder systems must meet in order to be identified with the applicable TSO marking. Flight data recorder systems that are to be so identified and manufactured on or after the date of this TSO must meet the standards set forth in the European Organization for Civil Aviation Electronics (EUROCAE), ED-55, "Minimum Operation Performance Specification for Flight Data Recorder Systems," Chapters 4, 5, 6, and 7, dated May 1990.

(2) Fire Test Requirements. The test procedure specified in EUROCAE ED-55, 7.1.5 Fire... is to be replaced by the high temperature fire and the low temperature fire test procedures of EUROCAE ED-56A, dated December 1993, Paragraph 5.3.2 Test Procedures d. High Temperature Fire and e. Low Temperature Fire with the following revision to d. 1.)...Change the second sentence to read as follows: "The entire external surface area of the recorder shall be exposed to the fire for a continuous period of at least 60 minutes.

(3) Environmental Standard. The environmental test procedures specified in EUROCAE ED-14C, "Environmental Conditions and Test Procedures for Airborne Equipment," dated December 1989, and RTCA, Inc. (RTCA) Document DO-160C, "Environmental Conditions and Test Procedures for Airborne Equipment," dated December 1989.

(4) Software. If the equipment design includes a digital computer, the software must be developed in accordance with RTCA Document No. DO-178B, "Software Considerations in Airborne Systems and Equipment Certification," dated December 1, 1992. In accordance with RTCA/DO-178B, Paragraph 9.3, the applicant must submit the following documents to the Manager, Aircraft Certification Office (AC), Federal Aviation Administration (FAA), having purview of the manufacturer's facilities, for review and approval:

Plan for Software Aspects of Certification (PSAC)
Software Configuration Index
Software Accomplishment Summary

All data supporting the applicable objectives found in Annex A, Process Objectives and Outputs by Software level, must be available for review. For software developed prior to the availability of RTCA/DO-178B, Section 12.1.4 provides a method for upgrading a baseline for software development so that changes can be made in accordance with the criteria contained in RTCA/DO-178B.

NOTE 1: The FAA recommends that the PSAC be submitted early in the software development process. Early submittal will allow the applicant to resolve issues with the Software Aspects of Certification Plan, such as partitioning and determination of software levels.

NOTE 2: The applicant should substantiate software levels in the safety assessment process outlined in RTCA/DO-178B. If the equipment incorporates more than one software level, appropriate partitioning of different software levels is required.

b. Marking. To comply with the Code of Federal Aviation Regulation (CFR) Section 21.607(d), the Technical Standard Order Authorization (TSOA) holder shall identify the software and hardware with the part number, or shall utilize a separate part number that identifies the software and hardware. The part number shall include the software version and level(s) in accordance with RTCA/DO-178B, and the modification status of the hardware (drawing revision or dash number).

NOTE: If multiple software levels are marked, the installation instructions must clearly identify the software level for each function.

(1) The TSOA holder shall legibly and permanently mark each separate, major component of equipment with the name of the manufacturer, the TSO number, and the part number, if the Administrator finds that such marking is necessary in the interests of safety.

c. Data Requirements.

(1) In addition to meeting the requirements of CFR Section 21.605, the manufacturer must furnish the Manager, Aircraft Certification Office (ACO), Federal Aviation Administration, having purview of the manufacturer's facilities, one copy each of the following technical data:

- (i) Operating instruction.
- (ii) Equipment limitations.
- (iii) Installation procedures and limitations.
- (iv) Schematic drawings as applicable to the installation Procedures.
- (v) Wiring diagrams as applicable to the installation procedures.

(vi) Specifications.

(vii) List of the major components (by part number) that make up the equipment complying with the standards prescribed in this TSO.

(viii) An environmental qualification form as described in EUROCAE ED-14C, and RTCA Document DO-160C for each component of the system.

(ix) Manufacturer's TSO qualification test report.

(x) Nameplate drawing.

(xi) The appropriate documentation as defined in RTCA Document DO-178B.

(2) In addition to those data requirements that are to be furnished directly to the FAA, each manufacturer must have available for review by the Manager of the ACO having purview of the manufacturer's facilities, the following technical data:

(i) A drawing list, enumerating all the drawings and processes that are necessary to define the article's design.

(ii) The functional test specification to be used to test each production article to ensure compliance with this TSO.

(iii) Equipment calibration procedures.

(iv) Corrective maintenance procedures (within 12 months after TSO authorization).

(v) Schematic drawings.

(vi) Wiring diagrams.

(vii) The appropriate documentation as defined in RTCA Document DO-178B.

(viii) The results of the environmental qualification tests conducted in accordance with RTCA Document DO-160C.

d. Data to be Furnished with Manufactured Units. One copy of the data and information specified in paragraphs (c)(1)(i) through (viii) of this TSO, and instructions for periodic maintenance and calibration which are necessary for continued airworthiness must go to each person receiving for use one or more articles manufactured under this TSO. In addition, a note with the following statement must be included in installation procedures and limitations:

“The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.”

e. Availability of Reference Documents.

(1) Copies of EUROCAE Document No's. ED-55, ED-56A, and ED-14C may be purchased from the European Organization for Civil Aviation Electronics, 17 Rue Hamelin, 75783 Paris Cedex 16, France.

(2) Copies of RTCA Documents No. DO-160C, may be purchased from the RTCA Inc., 1140 Connecticut Avenue, NW, Suite 1020, Washington, DC 20036.

(3) Federal Aviation Regulations Part 21, Subpart O, may be purchased from the Superintendent of Documents, Government Printing Office, Washington, DC 20402-9325. Advisory Circular 20-110 (current revision), “Index of Aviation Technical Standard Orders,” may be obtained from the U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

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