



Technical Standard Order

**Subject: TSO-C91a, EMERGENCY LOCATOR TRANSMITTER (ELT)
EQUIPMENT**

a. Applicability.

(1) Minimum Performance Standard. This Technical Standard Order (TSO) prescribes the minimum performance standard that emergency locator transmitter equipment must meet in order to be identified with the applicable TSO marking. This TSO has been prepared in accordance with procedural rules set forth in Subpart O of Federal Aviation Regulations (FAR) Part 21. New models of emergency locator transmitter equipment that are to be so identified and that are manufactured on or after the date of this TSO must meet the standards set forth in Radio Technical Commission for Aeronautics (RTCA) Document No. DO-183, "Minimum Operational Performance Standards for Emergency Locator Transmitters; Automatic Fixed - ELT (AF), Automatic Portable - ELT (AP), Automatic Deployable - ELT (AD), Survival - ELT (S); Operating on 121.5 and 243.0 Megahertz," Section 2.0, dated May 13, 1983.

(2) Deletions.

(i) Paragraph 2.1.4 - (Compliance with Federal Communications Commission (FCC) regulations are not required to obtain an authorization under this TSO, however, the FCC requires that ELT equipment comply with its applicable regulations.)

(ii) Paragraph 2.2.2.2.b

(3) Additions.

(i) Digital Computer Validation and Verification. If the equipment design implementation includes a digital computer, the computer software package must be validated and verified in a manner acceptable to the Administrator. An acceptable means of compliance for validation and verification of the computer software package is contained in RTCA/DO-178, "Software Considerations in Airborne Systems and Equipment Certification," November 18, 1981.

(ii) In lieu of optional Paragraph 2.2.2.2.b for modulation characteristics, the following applies as a requirement for this TSO: To aid SAR satellite detection, the ELT shall have clearly defined sideband components which are symmetric about the output signal spectrum and distinct from the carrier component at both the 121.5 and 243 MHz frequencies. The ELT spectrum at 121.5 MHz shall have at least 30% of its energy distribution within a bandwidth of plus or minus 30 Hz about a fixed reference frequency corresponding to the carrier component over the audio/sweep modulation cycle. At 243 MHz 30% of the energy distribution shall fall within a bandwidth of plus or minus 60 Hz.

b. Marking.

(1) In addition to the marking specified in FAR § 21.607(d), the environmental categories in which it has been qualified to operate in accordance with RTCA Document DO-160A shall be legibly and permanently marked on the major equipment component.

(2) Each separate component of equipment (antenna, transmitter, battery, monitor, etc.) must be permanently and legibly marked with at least the name of the manufacturer, the TSO number, digital computer software version (if applicable), and the environmental categories over which it has been tested.

c. Data Requirements.

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

- (i) Operating instructions.
- (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, including the actual performance of the equipment.
- (vii) List of the major components (by part number) that make up the equipment system complying with the standards prescribed in this TSO.
- (viii) Manufacturer's TSO qualification test report.

(ix) Nameplate drawing.

(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 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.

d. Data to be furnished with manufactured units. One copy of the data and information specified in paragraphs (c)(1)(i) through (vii) 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.

e. Previously Approved Equipment. ELT equipment approved prior to the date of this TSO may continue to be manufactured under the provisions of the original approval.

f. Relevance to TSO-C91 Requirements. The applicable requirements of this TSO provide an equivalent level of safety to that provided by, and may be used in lieu of, TSO-C91 requirements.

g. RTCA Document No. DO-188 provides guidance and recommendations for resolving ELT battery problems.

h. Availability of Reference Documents.

(1) Copies of RTCA Document Nos. DO-183, DO-160A, DO-178, and DO-188 may be purchased from the Radio Technical Commission for Aeronautics Secretariat, One McPherson Square, 1425 K Street, N.W., Suite 500, Washington, D.C. 20005.

(2) Federal Aviation Regulations, Part 21, Subpart O, and Advisory Circular 20-110B, "Index of Aviation Technical Standard Orders," may be reviewed at the FAA Headquarters in the Office of Airworthiness, Aircraft Engineering Division (AWS-110), and at all ACO's.

/S/ Joseph A. Pontecorvo
Acting Director of Airworthiness