



# Technical Standard Order

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**Subject: TSO-C126, 406 MHz EMERGENCY LOCATOR TRANSMITTER (ELT)**

a. Applicability.

(1) Minimum Performance Standard. This technical standard order (TSO) prescribes the minimum performance standard that 406 MHz emergency locator transmitters (ELTs) must meet in order to be identified with the applicable TSO marking. The 406 MHz ELTs that are to be so identified and are manufactured on or after the date of this TSO must meet the minimum performance standards set forth in RTCA, Inc. Document No. DO-204, "Minimum Operational Performance Standards (MOPS) 406 MHz Emergency Locator Transmitters (ELTs)," Section 2.0, dated September 29, 1989. Four basic types of ELTs are: Automated Fixed - ELT (AF), Automatic Portable - ELT (AP), Survival - ELT (S), and Automatic Deployable - ELT (AD).

(2) Environmental Standard. RTCA/DO-204 incorporates as a reference RTCA Document No. DO-160C, "Environmental Conditions and Test Procedures for Airborne Equipment," dated December 1989.

(3) Computer Software. If the equipment design implementation includes a digital computer, the software must be developed in accordance with RTCA Document No. DO-178A, "Software Considerations in Airborne Systems and Equipment Certification," dated March 1985. In accordance with RTCA/DO-178A, the applicant must submit a Software Aspects of Certification Plan (RTCA/DO-178A Document No. 14) for review and approval.

NOTE: The Federal Aviation Administration (FAA) strongly recommends that this plan be submitted as early as possible in the certification process. This will allow for early discussion and agreement between the applicant and the FAA on the software level or levels, the verification approach, and the documentation to be prepared and submitted.

b. Marking. In addition to the marking specified in Federal Aviation Regulations (FAR) Section 21.607(d), the following information shall be legibly and permanently marked on the major equipment components:

(1) Each separate component of equipment that is manufactured under this TSO must be permanently and legibly marked with at least the name of the manufacturer, the TSO number and part number.

c. Data Requirements.

(1) In addition to FAR 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 instructions.

(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.

(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 RTCA Document DO-160C, Appendix A.

(ix) Registration information.

(x) Manufacturer's TSO qualification test report.

(xi) Nameplate drawings.

(xii) The appropriate documentation as defined in RTCA Document DO-178A, or equivalent, necessary to support the verification and validation of the computer software to Level 1, 2, or 3. If the software is verified and validated to more than one level, the appropriate documentation for all such levels must be submitted.

(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-178A, or equivalent, necessary to support the verification and validation of the computer software to Level 1, 2, or 3. If the software is verified and validated to more than one level, the appropriate documentation for all such levels must be available for review.

(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 (ix) 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:

“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 on 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 it is approved by the Administrator.”

e. The Federal Aviation Regulations and other TSO Requirements for ELTs. This paragraph adds another option, the 121.5/406 MHz ELT configuration, to the configurations described in RTCA/DO-204, paragraph 1.2, System Overview.

An approved ELT is required for compliance with the FAR. A method of compliance is to obtain approval for installation of a 406 MHz ELT which meets the requirements of this TSO. The intended configuration of this ELT can be accomplished by either of two approaches:

(1) Installation of a stand-alone 406 MHz ELT to augment an existing 121.5/243.0 MHz ELT installation; or (2) Installation of an integrated 121.5/406 MHz or a 121.5/243.0/406 MHz ELT, of which the 121.5 or 121.5/243.0 MHz portion meets the requirements of TSO-C91a.

f. Registration. When a 406 MHz ELT is installed in an aircraft, it is imperative that the aircraft owner register the ELT with the National Oceanic and Atmospheric Administration. The following address should be used to register and obtain information on how to register 406 MHz ELTs: NOAA/NESDIS, SARSAT Operations Division, Code E/SP3, Federal Building 4, Washington, DC 20233. Registration information normally includes data on the ELT, aircraft owner, aircraft registration, and emergency contacts.

g. Battery Guidance.

(1) RTCA Document No. DO-188. This document provides guidance and recommendations for resolving ELT battery problems. The presented information, however, is not all inclusive and may be used in conjunction with other available publications, which address the safety of batteries.

(2) Lithium Batteries.

(i) Technical Standard Order C97 provides a minimum performance standard for one type chemistry, lithium sulfur dioxide, in the family of lithium based batteries. Because of earlier safety problems with lithium sulfur dioxide batteries (exploding, venting violently, corroding, and burning) the FAA issued a series of three airworthiness directives (AD). The final AD, issued in February 1980, is current and requires that lithium sulfur dioxide batteries used in U.S.- registered civil aircraft meet the requirements of TSO-C97. Batteries of this chemistry that were removed from service by the earlier AD's may be replaced by batteries which meet TSO-C97 or another power source. In either case all applicable FARs must be met.

(ii) Other types of lithium batteries may be suitable for use in ELTs; however, there is no available aviation standard that provides specific requirements dedicated to each battery chemistry. Currently RTCA Inc. Special Committee 168 is working on a MOPS for lithium batteries. When the MOPS is issued, the FAA expects to use it as a basis for a TSO and obtaining FAA approval.

h. Availability of Reference Documents.

(1) Copies of RTCA Document No. RTCA/DO-204, DO-160C, DO-188, and DO-178A may be purchased from the RTCA, 1140 Connecticut Avenue, NW, Suite 1020, Washington, DC 20005.

(2) Federal Aviation Regulations Part 21, Subpart O, and Advisory Circular 20-110, "Index of Aviation Technical Standard Orders," may be reviewed at the FAA Headquarters in the Aircraft Certification Service, Aircraft Engineering Division (AIR-120), and at all regional ACO's.

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