



**Date:**

# Technical Standard Order

**PROPOSED**

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**Subject: TSO-C142, LITHIUM BATTERIES**

**1. PURPOSE.** This technical standard order (TSO) prescribes the minimum performance standard that lithium cells and batteries must meet to be identified with the applicable TSO marking.

**2. APPLICABILITY.** The standards of this TSO apply to lithium cells and batteries intended to provide power for aircraft equipment including emergency and standby systems. The RTCA Inc. (RTCA) Document No. DO-227, “Minimum Operational Performance Standards for Lithium Batteries,” dated June 23, 1995 contains both requirements and guidance covering chemical composition, quantity of potentially hazardous substances, cell size, cell construction, interconnection of cells into batteries, fusing, venting, current limiting, operational and storage environments, packaging, handling, tests, and disposal which affect the use of these articles in aircraft.

**3. REQUIREMENTS.** Lithium batteries that are to be so identified must meet the standards set forth in RTCA/DO-227, Section 2.0.

**a. Failure Condition Classification.** Failure of the function defined in paragraph 2 of this TSO has been determined to be a hazardous major failure condition. The applicant must develop batteries which will provide at least a design assurance level commensurate with this failure condition classification.

**b. Environmental Qualification.** Lithium cells or batteries shall be subject to the test conditions as specified in RTCA/DO-227, Section 2.3.

**4. MARKING.** Each lithium cell or battery must be marked in accordance with 14 CFR 21.607(d) and RTCA/DO-227, Section 1.4.6.

## **5. DATA REQUIREMENTS.**

**a. Data to be provided with the application** In accordance with 14 CFR 21.605 (a), the manufacturer must furnish the Manager, Aircraft Certification Office (ACO), Federal Aviation

Administration (FAA), having purview of the manufacturer's facilities, one copy of the following technical data to support the FAA design and production approval:

(1) Operating instructions and equipment limitations. The limitations shall be sufficient to describe the operational capability of the equipment.

(2) Installation procedures and limitations. The limitations shall be sufficient to ensure that the appliance, when installed in accordance with the installation procedures, continues to meet the requirements of this TSO. The limitations shall include the following statement: "The conditions and tests required for this TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article in a specific 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."

(3) Schematic drawings as applicable to the installation procedures.

(4) Wiring diagrams as applicable to the installation procedures.

(5) Specifications.

(6) List of components by part number.

(7) Instructions for periodic maintenance and calibration which are necessary for continued airworthiness once the equipment is installed.

(8) An environmental qualification form describing the environmental tests that were conducted in accordance with RTCA/DO-227, Section 2.3.

(9) Manufacturer's TSO qualification test report.

(10) Nameplate drawing.

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

**b. Data that must be available upon request.**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:

(1) The functional qualification specifications to be used to qualify each production article to ensure compliance with this TSO.

(2) Equipment calibration procedures.

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

(4) Schematic drawings.

(5) Wiring diagrams.

(6) The results of qualification tests conducted in accordance with RTCA/DO-227, Section 2.0.

**c. Data to be furnished with Manufactured Units.** One copy of the data and information specified in paragraphs 3(a)(1) through (8) must go to each person receiving for use one or more articles manufactured under this TSO.

## **6. AVAILABILITY OF REFERENCE DOCUMENTS.**

(a) Copies of RTCA Document No. DO-227 may be purchased from the RTCA Inc., 1140 Connecticut Avenue, N.W., Suite 1020, Washington, D.C. 20036-4001.

(b) Federal Aviation Regulations Part 21, Subpart O, may be purchased from: Superintendent of Documents, Government Printing ~~Off~~, Washington, DC 20402-9325.

(c) Advisory Circular 20-110 (current revision), "Index of Aviation Technical Standard Orders," may be obtained from: U.S. Department of Transportation, Subsequent Distribution Office, Ardmore East Business Center, 3341 Q 75th Avenue, Landover, MD 20785.

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