ETSO-C142b

ED Decision 2020/011/R (applicable from 25.7.2020)

NON-RECHARGEABLE LITHIUM CELLS AND BATTERIES

1 Applicability

This ETSO provides the requirements which non-rechargeable lithium cells and batteries that are intended to provide power for aircraft equipment, including emergency systems, that are designed and manufactured on or after the effective date of this ETSO must meet in order to be identified with the applicable ETSO marking.

This ETSO is not applicable to coin or button cells that contain less than 2 watt-hours (Wh) of capacity, and that is are compliant with the requirements of UL 1642 and the UN transport regulations.

2 Procedures

2.1 General

The applicable procedures are detailed in CS-ETSO, Subpart A.

2.2 Specific

None.

3 Technical Conditions

3.1 Basic

3.1.1 Minimum Performance Standard

RTCA document DO-227A 'Minimum Operational Performance Standard (MOPS) for Non Rechargeable Lithium Batteries' from 21 September 2017, as amended by Appendix 1 to this ETSO.

3.1.2 Environmental Standard

Non-rechargeable lithium cells and batteries must be tested according to RTCA document DO-227A Section 2.0 unless otherwise specified by Appendix 1 to this ETSO.

3.1.3 Software

See CS-ETSO, Subpart A, paragraph 2.2.

3.1.4 Airborne Electronic Hardware

See CS-ETSO, Subpart A, paragraph 2.3.

3.2 Specific

3.2.1 Failure Condition Classification

See CS-ETSO, Subpart A, paragraph 2.4.

4 Marking

4.1 General

See CS-ETSO, Subpart A, paragraph 1.2.

4.2 Specific

Each lithium cell or battery must be marked in accordance with RTCA document DO-227A, Section 2.1.10.

In addition, the non-rechargeable lithium cell, battery or end item must be marked as ETSO-C142b-X as described in the following table:

X	Cell, Battery or End Item
– 1	Cell
– 3	Battery
– 5	End Item
– 7	< 5 Wh within End Item Cells and batteries must meet at a minimum UL1642 and UN 38.3 certification. (see Note below)

Note: For ETSO-C142b-7 approvals, the ETSO marking must be on the End Item. The cell or battery within the End Item must be part marked and identified as a component within the End Item. The cell or battery must have a notation in the manufacturer's documentation that the cell or battery is not to be used in another End Item unless it is tested separately in the new End Item. The End Item is required in order to meet the requirement of this ETSO, and the configuration control documentation must state that the cell or battery is approved based solely on the fact that it is tested and validated within the approved End Item. Only cells or batteries that are approved under the ETSO-C142b End Item article may be used. Cells or batteries should only be used if they are approved by the manufacturer of the article. If a different cell or battery is to be used with this End Item, the manufacturer must submit a new ETSO application (for the End Item) to EASA.

5 Availability of Referenced Documents

See CS-ETSO, Subpart A, paragraph 3.

[Amdt ETSO/3]
[Amdt ETSO/16]

Appendix 1 to ETSO-C142b – Minimum Performance Standard for Lithium Batteries

ED Decision 2020/011/R

This Appendix prescribes the MPS for lithium batteries, as modified by this ETSO.

The standard is modified as follows:

Table 1— Text modifications to RTCA document DO-227A

RTCA DO-227A Section and title:	***Current wording:***	**Modified wording:**
1.4 Specific Exclusions from this document	c. Cells or batteries containing less than 2 Watt-hours (Wh) of capacity have sufficiently low energy that the possible hazard is considered low and therefore these cells and batteries are assessed as presenting an acceptably low risk for installation as long as they are compliant with the requirements of UL 1642 [Reference 9]. If compliant with UL 1642 and the UN transport regulations [Reference 10], no other requirements from this MOPS will apply to cells or batteries with less than 2 Wh of capacity.	c. Coin or button cells that contain less than 2 watt-hours (Wh) of capacity have sufficiently low energy that the possible hazard is considered to be low, and therefore these cells and batteries are assessed as presenting an acceptably low risk for installation as long as they are compliant with the requirements of UL 1642 [Reference 9]. If they are compliant with UL 1642 and the UN transport regulations [Reference 10], no other requirements from this MOPS will apply to coin or button cells with less than 2 Wh of capacity.
n/a	./.	d. For non-rechargeable cells and/or batteries that contain less than 5 Wh and have not been tested to RTCA document DO-227A, Sections 1.0 and 2.0, the requirement of this ETSO can be met under the 'End Item testing' described in DO-227A, Sections 2.2.3 and 2.4.3. Mark the cell or battery per Section 4.2 of this ETSO (ETSO-C142b-7). Note: For ETSO-C142b-7 approvals, the ETSO marking must be on the End Item and the cell or battery as well. The cell or battery must have a notation in the manufacturer's documentation that the cell or battery is not to be used in another End Item. The End Item is needed in order to meet the requirement of this ETSO,

RTCA DO-227A Section and title:	Current wording:	Modified wording:
		and the configuration control documentation must state that the cell or battery is approved based solely on the fact that it is tested and validated within the approved End Item. Only cells or batteries that are approved under the ETSO-C142b End Item article may be used. Cells or batteries should only be used if they are approved by the manufacturer of the article. If a different cell or battery is to be used with this End Item, a new ETSO application (for the End Item) must be submitted to EASA.
2.4.1.2.1	(…) Test procedure (…) d. immediately start to discharge the sample cells using the DC power supply set at a constant current and with a voltage of limit of 3 volts. (…)	(…) Test procedure (…) d. immediately start to discharge the sample cells using the DC power supply set at a constant current and with a voltage of limit set to the cell nominal voltage. (…)
2.4.3	(…) Testing shall be accomplished in the order indicated in Figure 2-27. (…) End Item safety tests may be conducted using just two End Items by performing the non-destructive thermal management and load profile test first, followed by the thermal runaway containment tests using the same two End Items (with new batteries). All actual batteries used in the End Item safety tests will have previously passed the End Item vibration and shock tests.	(…) Remove ‘Testing shall be accomplished in the order indicated in Figure 2-27’. (…) End Item safety tests may be conducted using just two End Items by performing the non-destructive thermal management and load profile test first, followed by the thermal runaway containment tests using the same two End Items (with new batteries). Remove ‘All actual batteries used in the End Item safety tests will have previously passed the End Item vibration and shock tests’.

In addition, in Section 2.4.2.1.7, replace Table 2-2 and Figure 2-16 with the following table and figure:

Time (Hours)	Duration (Hours)	Temperature (˚C)	% Relative Humidity
0-24	24	23	50
24-26	2	Ramp to 30	Ramp to 95
26-28	2	Soak 30	95
28-30	2	Ramp to 60	95
30-42	12	Soak 60	95
42-44	2	Ramp to 30	95
44-56	12	Soak 30	95
56-58	2	Ramp to 60	95
58-70	12	Soak 60	95
70-72	2	Ramp to 30	95
72-84	12	Soak 30	95
84-86	2	Ramp to 60	95
86-98	12	Soak 60	95
98-100	2	Ramp to 30	95
100-112	12	Soak 30	95
112-114	2	Ramp to 60	95
114-126	12	Soak 60	95
126-128	2	Ramp to 30	95
128-140	12	Soak 30	95
140-141	1	Ramp to 23	95

Table 2-2: Table of relative humidity / temperature test profile values

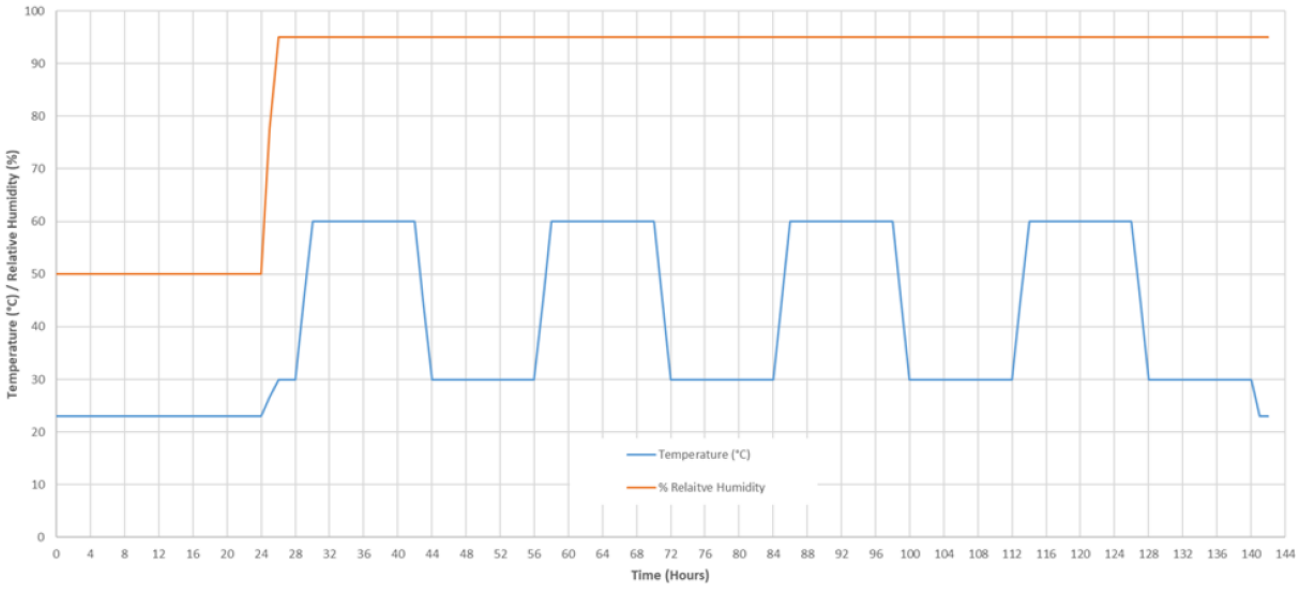

Figure 2-16: Humidity test profile of temperature and humidity versus time

[Amdt ETSO/3]
[Amdt ETSO/16]

ETSO-C144a

ED Decision 2010/010/R (applicable from 21.12.2010)

PASSIVE AIRBORNE GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS) ANTENNA

1 Applicability

This ETSO gives the requirements which new models of passive airborne Global Navigation Satellite System (GNSS) Antenna that are manufactured on or after the date of this ETSO must meet in order to be identified with applicable ETSO marking.

2 Procedures

2.1 General

Applicable procedures are detailed in CS-ETSO Subpart A.

2.2 Specific

None.

3 Technical Conditions

3.1 Basic

3.1.1 Minimum Performance Standard

Standards set forth in RTCA document DO-228, "Minimum Operational Performance Standards for Global Navigation Satellite System (GNSS) Airborne Antenna Equipment" dated October 20, 1995, Section 2 (excluding Sections 2.2.2 and 2.4.3) and Change 1 to DO-228.

Note 1: For Active Airborne Global Navigation Satellite System (GNSS) Antenna, see ETSO-C190

Note 2: The ETSO standards herein apply to equipment intended to receive and provide signals to a global positioning system (GPS)/satellite based augmentation system (SBAS) operational Class 1, or GPS, sensor or system that will provide flight path deviation commands to the pilot or autopilot. These standards do not address the use of the signals received through this antenna for other applications. GPS/SBAS operational classes are defined in RTCA document DO-229D "Minimum Operational Performance Standards for Global Positioning System/Wide Area Augmentation System Airborne Equipment", dated December 13, 2006, Section 1.4.2.

3.1.2 Environmental Standard

See CS-ETSO Subpart A paragraph 2.1.

3.1.3 Computer Software

See CS-ETSO Subpart A paragraph 2.2.

3.1.4 Electronic Hardware Qualification

See CS-ETSO Subpart A paragraph 2.3.

3.2 Specific

3.2.1 Failure Condition Classification

See CS-ETSO Subpart A paragraph 2.4