

Deviation Request ETSO-C142a#4 for an ETSO approval for CS-ETSO applicable to NON-RECHARGEABLE LITHIUM CELLS and BATTERIES (ETSO-C142a)

Consultation Paper

1 Introductory Note

The hereby presented deviation requests shall be subject to public consultation, in accordance with EASA Management Board Decision No 7-2004 as amended by EASA Management Board [Decision No 12-2007](#) products certification procedure dated 11th September 2007, Article 3 (2.) of which states:

“2. Deviations from the applicable airworthiness codes, environmental protection certification specifications and/or acceptable means of compliance with Part 21, as well as important special conditions and equivalent safety findings, shall be submitted to the panel of experts and be subject to a public consultation of at least 3 weeks, except if they have been previously agreed and published in the Official Publication of the Agency. The final decision shall be published in the Official Publication of the Agency.”

2 ETSO-C142a#4 NON-RECHARGEABLE LITHIUM CELLS and BATTERIES

2.1 Summary of Deviation

Deviates from ETSO-C142a by using RTCA DO-227A, corrected to permit the use of an appropriate limiting voltage for the Cell Discharge Current Test, instead of DO-227 modified by Appendix 1 of ETSO-C142a.

2.2 Original Requirement

ETSO-C142a

3.1.1 - Minimum Performance Standard

RTCA DO-227 “Minimum Operational Performance Standard for Lithium Batteries” from June 1995 unless otherwise specified by Appendix 1 of this ETSO

3.1.2 - Environmental Standard

Non-Rechargeable Lithium Cells and Batteries must be tested according to RTCA DO-227 Section 2.3 unless otherwise specified by Appendix 1 of this ETSO

4.2. – Specific

Each lithium cell or battery must be marked in accordance with RTCA DO-227, Section 1.4.6.

DO-227A

2.4.1.2.1 Cell Discharge Current Test

(...)

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. (...)

2.3 Industry

EASA advertised their intent to recognize the use of RTCA DO-227A in place of the current RTCA DO-227, which should be the MPS for the future ETSO-C142b. Until ETSO-C142b is published, the industry needs to get batteries and end-items approved in accordance with DO-227A. EASA is granting credit for this new version of DO-227A to show compliance to the applicable special conditions at installation level. FAA is following the same approach.

However, DO-227A section 2.4.1.2.1 Cell Discharge Current Test fixes the voltage limit to a fix value 3 Volt, while this value should be dependent on the cell nominal voltage¹.

Indeed, in DO-227A section 2.4.1.2.2 Cell Polarity Reversal Test, the step b. of the test procedure permits to adapt the voltage to the cell nominal voltage: 'The power supply shall be voltage-limited to represent an additional cell in series with the test sample (i.e., 3 volts for a 3 volt cell)'.

In conclusion, the step d. of the test procedure of 2.4.1.2.1 Cell Discharge Current Test should read:

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. (...)

It should be noted that DO-227 section 2.4.1.2 Discharge Test and 2.4.1.3 Forced Discharge Test are not containing any requirement regarding the voltage-limiting of the power supply.

2.4 Equivalent Level of Safety

An equivalent level of safety is provided by the more stringent testing requirements imposed by DO-227A compared to the requirements of the DO-227 as amended by the appendix 1 of ETSO-C142a, while permitting the use of an appropriate limiting voltage for the Cell Discharge Current Test.

2.5 EASA position

We accept the deviation.

¹ DO-227 Appendix A defines the nominal voltage as the reported or reference voltage of the cell/battery, also sometimes referred to as the "normal" voltage of the cell/battery when under light electrical loading.