

## Summary of the 16<sup>th</sup> Plenary Special Committee 235 - Non-Rechargeable Lithium Batteries Active Status Meeting

### Meeting Summary:

The 16<sup>th</sup> Plenary Meeting of Special Committee 235 (SC-235) was held on July 26, 2021. The meeting was conducted as a Virtual Meeting with the following attendees participating via WebEx:

---

John Trela (Chairman)	The Boeing Company
Norman Pereira (Government Authorized Representative)	Federal Aviation Administration
Jeff Densmore (Secretary)	Radiant Power Corporation
Karan Hofmann (Program Director)	RTCA, Inc.
Stephanie Bailly	Airbus
Antonio Chiesa	Transport Canada
James Christo	NOAA
Brian Conlee	Saft America
Claude Cresp	ECA Aerospace
Rodolfo Duran	Astronics DME
Nazih Khaouly	Federal Aviation Administration
John Neilson	Ultralife
Thomas Pack	ACR Electronics
Paul Pfeifer	Textron
Jim Russell	The Boeing Company
Inderbir Sandhu	Honeywell
Leire Segura Martinez de Ilarduya	Airbus
Adrian Sfetcu	Bell Helicopter Textron
Nathalie Verite	Airbus
Clayton Vondrasek	Garmin

---

## Opening Plenary

- The 16<sup>th</sup> Plenary meeting of SC-235 was convened on July 26, 2021 at 11:00pm EDT by Chair John Trela (Boeing). Jeff Densmore (Radiant Power) was the SC-235 Recording Secretary.
- Norman Pereira was introduced as the Government Authorized Representative.
- An RTCA overview, including RTCA's Proprietary References Policy was read by Karan Hofmann, the Program Director.
- Welcoming remarks were made by John Trela. Each person in attendance was invited to introduce themselves.
- The meeting agenda was reviewed.
- The Meeting Summary for SC-235 Plenary #15 was reviewed and approved with one minor change. The meeting summary referred the SC-235 in Active Monitor Status instead of Active Status. The meeting summary has been amended accordingly and uploaded to the AerOpus folder for Plenary #15.
- All documents and presentation material reviewed during Plenary #16 have been uploaded and are available on in the RTCA AerOpus documents folder. A link to this folder is provided below.  
[Group - SC-235 Non-Rechargeable Lithium Batteries - AerOpus \(i3cloudservices.com\)](#)

## Plenary #15 Action Item Review

There were three (3) action items assigned during Plenary #15. The status of each is reviewed below:

- (1) Coordinate with EASA regarding the updated TOR and March 22, 2022 completion date.  
Assigned to: John Trela  
Status: **CLOSED**  
John coordinated via email requesting EASA to confirm that acceptance with the updated TOR and its aim to have DO-227B through FRAC in March of 2022 with PMC approval in June 2022. He further invited EASA to attend the weekly Working Group meetings. EASA replied that they had no comments to the TOR or its schedule and agreed to attend the Weekly Meetings as their schedule permitted.
- (2) Summarize and forward comments to DO-227A based on previous and on-going testing efforts  
Assigned to: John Neilson  
Status: **CLOSED**  
John has reviewed all of their internal comments and stated that they have all been address already by the committee. No further comments are anticipated at this time.
- (3) Summarize and forward comments to DO-227A based on previous and on-going testing efforts  
Assigned to: Susanna Bruffett  
Status: **OPEN**  
Susanna was unable to attend Plenary #16. Therefore, she was unable to present any of their comments. This action remains open until next Plenary and Jeff stated that he would contact Susanna as a reminder.

## Working Group Progress Report

Jim Russell has been leading the weekly Working Group meetings and provided an update on their activities as follows.

### 1. *Review of all previously accepted changes.*

A quick review was provided of the editorial changes previously accepted by the committee during its Active Monitoring Status. These changes have already been incorporated in the working copy of DO-227B.

### 2. *Changes to the Open Circuit Voltage (OCV) requirements during Cell testing.*

The Working Group recommended the following wording change to the OCV monitoring requirements during cell testing:

*“Decrease in open circuit voltage shall be less than 2% (Cell shall retain at least 98% of OCV). Increase in OCV is not a safety concern, but may have performance implications. OCV change is a reportable item.”*

This change was driven by several factors including observed variations greater than 2% for certain Lithium Chemistries (LiFeS<sub>2</sub>) and direct feedback from cell manufacturers including Ultralife and Saft stating that increases in OCV were not concerning from a safety point of view. After discussing, the committee agreed to proceed with the suggested change.

During the discussion, it was asked what the basis was of the original +/- 2% requirement. No one was able to answer this question as none of the current members participated in the original creating of DO-227. It was agreed that the following note be captured in the comment tracking spreadsheet for future reference: *“The 2% threshold was established by the authors (industry experts) of DO-227 in 1995 and there is no proposal to change that value at this time.”*

### 3. *Cell-level Polarity Reversal Discussion*

The Working Group has been discussing the merits of the Cell-Level Polarity Reversal test given two main reasons: (1) polarity reversal is a multi-cell battery condition rather than a cell level condition and (2) there is already a Battery-level polarity reversal test in DO-227A. This subject was further discussed during this Plenary to seek broader inputs.

Both Saft and Ultralife stated that it is physically impossible for a single cell to enter a reversed polarity condition on its own and agreed that the condition is applicable to the battery-level versus the cell-level.

It was suggested that the cell-level polarity reversal test be deleted. The committee, including the FAA and Transport Canada, accepted the inputs from the cell manufacturers and agreed to delete the test. This is acceptable because the reversal hazard is addressed by the battery-level reversal test as well as by the Thermal Runaway test. Along these lines, however, it was stated that DO-227B should address situations for batteries containing sub-cells (e.g. 9V batteries).

During a side discussion on this topic, it was mentioned that equipment manufacturers have classified the use of rechargeable lithium batteries as “non-rechargeable” in applications where they cannot be charged when installed on the aircraft. In these cases, the equipment manufacturers have used the DO-227A MOPS versus the DO-311A MOPS. This was generally felt to be an incorrect application of the requirements and it was agreed that DO-227B should contain clarifying language that this is not within the scope of the non-rechargeable lithium batteries MOPS.

Finally, it was stated that the Working Group will continue to improve the definitions of cell capacity with respect to the manufacturer’s ratings

**4. 5Whr Cell discussion.**

TSO-C142b currently allows for a “-7” category of single cell batteries with less than 5Whr. For this category, only the End Item tests are required if the cell also has UL1642 and UN 38.3 certification. It was agreed that DO-227B should incorporate this provision. Additionally, it was also stated that the “coin or button cell” restriction on the 2Whr category from TSO-C142b, Appendix 1 be captured in DO-227B.

**5. Mitigation of cell level failures by containment in end item.**

DO-227A currently allows for a limited number of cell failures to be mitigated at the battery and/or end-item levels. The Working Group has discussed this topic and there is an opinion that any cell failure should be allowed to be mitigated at higher levels.

The FAA strongly disagreed with this notion. However, many on the committee raised arguments as to why it should be allowed. Claude Cresp from ECA Aerospace took an action to summarize and submit a draft proposal allowing for mitigation of cell-level failures (see below).

Time did not permit discussion of the End-Item Test Sequence and methods for measuring and reporting vented gas conditions. These topics will continue to be discussed during the Working Group meetings and added to the agenda for the next Plenary meeting.

**Action Item Summary**

- (1) Summarize and forward comments to DO-227A based on previous and on-going testing efforts  
Assigned to: Susanna Bruffett
- (2) Summarize and forward comments to DO-227A based on previous and on-going installation efforts  
Assigned to: Leire Segura Martinez de Ilarduya
- (3) Submit a draft proposal for allowing mitigation of cell failures at higher levels.  
Assigned to: Claude Cresp

**Working Group Meetings**

Weekly Working Group meetings will continue Monday’s at 10am (EDT) for one hour. The next meeting will be held on August 9, 2021.

**Next Plenary**

Plenary #17 has been tentatively scheduled as a Virtual Meeting on September 27, 2021. A detailed agenda and WebEx meeting information will be issued closer to this meeting date.

-S-  
Jeff Densmore  
Secretary

**CERTIFIED** as a true and accurate summary of the meeting.

-S-  
John Trela  
Chairman