

Summary of the 18th Plenary Special Committee 235 - Non-Rechargeable Lithium Batteries Active Status Meeting

Meeting Summary:

The 18th Plenary Meeting of Special Committee 235 (SC-235) was held on November 8, 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.
Antonio Chiesa	Transport Canada
Bill Cox	ACR Electronics
Claude Cresp	ECA Aerospace
Sebastian Dassaud	ECA Aerospace
Nazih Khaouly	Federal Aviation Administration
Christopher Kusak	U.S. Air Force
Michael Levi	ACR Electronics
Keith McKnight	Federal Express Corporation
Frederic Menard	Orolia
Fernando Menendez Rodriguez	EASA
Kathryn Mulhollen	U.S. Air Force
John Neilson	Ultralife
Tom Pack	ACR Electronics
Paul Pfeifer	Textron
Ray Rodriguez	U.S. Air Force
Jim Russell	The Boeing Company
Adrian Sfetcu	Bell Helicopter Textron
Greg Smith	U.S. Air Force
Dan Stanovic	ACR Electronics
Clayton Vondrasek	Garmin

Opening Plenary

- The 18th Plenary meeting of SC-235 was convened on November 8, 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 #17 was reviewed and approved as written. There was a lengthy discussion that occurred during the meeting summary review regarding mitigation of cell level failures at higher levels. It was agreed that the meeting summary accurately captured the topic from Plenary #17 and that further discussion during Plenary #18 was necessary because there remains a lack of consensus within the committee.
- All documents and presentation material reviewed during Plenary #18 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 \(i3cloudservices.com\)](https://i3cloudservices.com/Group-SC-235-Non-Rechargeable-Lithium-Batteries-AerOpus)

Plenary #17 Action Item Review

There were two (2) action items assigned during Plenary #17. The status of each is reviewed below:

- (1) 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 #17. Therefore, she was unable to present any of their comments.
- (2) Summarize and forward comments to DO-227A based on previous and on-going installation efforts
Assigned to: Leire Segura Martinez de Ilarduya
Status: **OPEN**
Leire was unable to attend Plenary #17. Therefore, she was unable to present any of their comments.

Working Group Progress Report

Before discussing the Working Group activities, Jim Russell announced that he will be retiring from Boeing at the end of November. He indicated that he would like to remain involved in SC-235 throughout the update of DO-227B, which RTCA indicated would be allowed. Jim received well wishes from all on the committee along with a collective Thank You for all of his efforts and contributions.

Jim Russell then provided an update from the weekly Working Group meetings as follows:

1. *Mitigation of Cell Failures at the Next Higher Level(s)*

As mentioned above in the Meeting Summary review from Plenary #17, continued discussion regarding this topic was necessary. It was pointed out that DO-227A is utilized for both TSO approval (via TSO-C142b) and installation approval to show compliance to the non-rechargeable lithium battery special conditions (via draft AC20-192). More specifically, compliance with Special Condition SC1 requires all cell level tests be successfully completed. Without any allowance to mitigate cell level tests failures, installers require a project specific alternate means of compliance. After a lengthy discussion, it was agreed to table this topic once again with a request for John Trela to suggest potential wording changes (perhaps to Section 3) for discussion during the on-going Working Group meetings.

2. *Thermal Runaway “Best Practices” / Vented Gas Data*

EASA had requested that the committee recommend a method for collecting data on any vented gases during Thermal Runaway. Several options were discussed including the use of an array of thermocouples to capture the velocity and direction of the escaping gas. A competing option was to utilize a thermocouple instrumented aluminum plate placed a short distance from the test article. This approach would provide a more repeatable means to collect the subject data. After review, the committee opted to recommend the aluminum plate approach. The details of this approach will be defined and included in the “best practices” test methods and procedures discussed below.

3. *Rated Capacity*

Cell Level testing include a pre and post capacity test. The requirements state that the applicant should perform a capacity test per the manufacturer’s defined capacity. In some cases, this could result in an extremely long test. For example, a 1Ahr cell may produce this capacity at a 1mA constant current discharge. Performing this test would take approximately 1,000 hours (~42 days). Because these tests are intended to demonstrate a cell’s ability to maintain its capacity after exposure to all required environmental tests, it was suggested that an alternate, quicker capacity test be considered. After discussing, the committee agreed that an ambient (23°C) capacity test at a constant current of C/10 would be an acceptable alternate procedure. Glossary definitions and the test procedure will be refined based on inputs from cell manufacturers during in the Working Group and presented at the next Plenary.

4. *Multi-Cell Cells (e.g. 9V batteries)*

The committee revisited this subject once again as questions remain. During Plenary #17, the committee agreed to proceed with treating multi-cell products as a single cell battery as long as the sub-cells are not individually accessible. There were some new dissenting views expressed to this approach during Plenary #18. As a result, it was suggested that these types of devices be considered “out of scope” for DO-227B and any applicant wishing to use these types of devices would have to consult with their certifying civil aviation authority. This idea gained traction and is now being considered as a solution to this topic.

Action Item Summary

There were no new action items assigned during Plenary #18. The following two (2) actions remain open from previous meetings.

- (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

Working Group Meetings

Weekly Working Group meetings will continue on Monday's at 10am (EST) for 1 hour. It was also suggested that a second Working Group be formed to draft an Appendix to DO-227B to document Thermal Runaway test procedure "best practices." Volunteers were requested to participate in this group.

Next Plenary

Plenary #19 has been tentatively scheduled as a Virtual Meeting on January 18, 2022. A detailed agenda and WebEx meeting information will be issued closer to this meeting date.

In closing John, Norm, Karan, and I would like to extend our heartfelt gratitude to Jim Russell for his contribution of countless hours supporting SC-235. His efforts have been invaluable to the committee and his technical expertise often relied upon. We wish Jim all the best on his upcoming retirement and are grateful that he is willing to remain involved in the committee in the coming months as we push towards the release of DO-227B. Congratulations on your retirement Jim!

-S-
Jeff Densmore
Secretary

CERTIFIED as a true and accurate summary of the meeting.

-S-
John Trela
Chairman