

## **Summary of the 35<sup>th</sup> Plenary Special Committee 235 - Non-Rechargeable Lithium Batteries**

### **Meeting Summary:**

The 35<sup>th</sup> Plenary Meeting of Special Committee 235 (SC-235) was held on June 26, 2024. The meeting was conducted as a Virtual Meeting with the following attendees participating via WebEx.

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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
Jim Dellinger	National Institute for Aviation Research
Nazih Khaouly	Federal Aviation Administration
Tom Maloney	Federal Aviation Administration
Frederic Menard	Safran Electronics and Defense Beacons
Paul Pfeifer	Textron
Alan Rudnai	Leonardo DRS
Fernando Menedez Rodriguez	EASA

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### **Opening Plenary**

- The 35<sup>th</sup> Plenary meeting of SC-235 was convened on June 26, 2024 at 10:00am 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 #34 was reviewed and approved as written. The meeting summary has been posted on AerOpus.
- All documents and presentation material reviewed during Plenary #35 have been uploaded and are available in the RTCA AerOpus documents folder for this meeting.

## Plenary #34 Action Item Review

There were six open Action Items following Plenary #34

- 1) Consult with Cell and Battery OEM's regarding transient OCV variation (timing and characteristics) as a result of the vibration environment. These inputs will help shape the monitoring requirements.
  - a. Assigned to: ~~Jim Russell~~ John Trela
  - b. Status: **CLOSED**. The sampling rates for OCV for "high rate" during vibration have been determined and defined within the document.
- 2) Delegate resolution of the requirements rationale changes proposed by Antonio Chiesa
  - a. Assigned to: ~~Jim Russell~~ ~~Jeremy Zee~~ John Trela
  - b. Status: **OPEN**. With Jim's retirement and Jeremy's departure from Boeing, this action was reassigned to John Trela
- 3) Create a DO-227A vs DO-227B comparison Table for Insertion into the document
  - a. Assigned to; Jeff Densmore and John Trela
  - b. Status: **OPEN**. This action cannot be completed until all of the FRAC comments have been resolved.
- 4) Review the Test Setup and Test Procedure sections for the Cell, Battery, and End Item and remove "Shall" statements.
  - a. Assigned to: John Trela
  - b. Status: **CLOSED**. This has been accomplished via WG meetings
- 5) Review items identified as "Reportable" for consistency with the test setup and procedures.
  - a. Assigned to John Trela
  - b. Status: **CLOSED**. This has been accomplished via WG meetings
- 6) Update Shock Profile Figures (incorrect) and the Vibration / Shock Setup Figures (make generic for both tests).
  - a. Assigned to: John Trela
  - b. Status: **CLOSED**. This has been accomplished via WG meetings.

### DO-227A versus DO-227B Comparison Table

The committee discussed action item #3 above at length. There was debate regarding the format, content, and usefulness of 227A vs 227B comparison table. There was also concern expressed about the timing and potential impacts to the release of the document. At the conclusion of the discussion, it was agreed that the comparison table would be created by a focused working group after resolution of all FRAC comments and prior to submittal of the document to RTCA for PMC review and approval.

**DO-227B Final Review and Comment**

Plenary #35 was the third plenary of SC-235 following the second Final Review and Comment (FRAC) process for DO-227B. Entering Plenary #35, the status of all comments was as follows.

<b>Comment Type</b>	<b>Total</b>	<b>Resolved</b>	<b>Percentage</b>	<b>Unresolved</b>	<b>Percentage</b>
Non-Concur	1	1	100.00%	0	0.00%
High	30	30	100.00%	0	0.00%
Medium	124	109	87.90%	15	12.10%
Low	98	92	93.88%	6	6.12%
Editorial	98	96	97.96%	2	2.04%
	351	328	93.45%	23	6.55%

**Comment Discussion and Resolution**

High, Medium, Low, and Editorial Comments

The following table summarizes the comments reviewed and resolved during the Plenary meeting.

Id	Category	Section	Subject	Comment	Disposition	Resolution
68210	Medium	2.4.2.1.7	Battery Humidity Test	This is more descriptive than the table, but still vague. Also this differs from the Cell Humidity test profile. Why? This was discussed during the last FRAC, but it is not clear why the cell and battery profiles were not harmonized. I recommend that the cell profile be used for BOTH tests. The cell profile is correct, accurate, and well documented.	Rejected	6/20/24: Need to discuss in WG meeting 6/26/24: Cleaned up test procedures to be consistent but kept cycle profile the same as DO-227A
68211	Medium	2.4.2.1.7	Battery Humidity Test	This Table is not as detailed as Table 2-1 for the cell humidity test. I recommend adopting the Cell profile and use Table 2-1.	Rejected	6/20/24: Need to discuss in WG meeting 6/26/24: Cleaned up test procedures to be consistent but kept cycle profile the same as DO-227A
68212	Medium	2.4.2.1.7	Battery Humidity Test	This figure is not as detailed as figure 2-6 for the cell humidity test. I recommend adopting the cell profile and use Fure 2-6	Rejected	6/20/24: Need to discuss in WG meeting 6/26/24: Cleaned up test procedures to be consistent but kept cycle profile the same as DO-227A
68218	Low	2.4.2.2.6	Battery External Short Circuit with Protections Disabled	Reportable item Question: If, for instance, a trace opens on a PCB within the battery or a connector contact fails in an open circuit condition due to excessive current that could be present in this test, is this considered a failure? Would the test have to be repeated with mechanisms in place to prevent this behavior if it were to occur?	Rejected	6/20/2024: Open Item needs to be discussed 6/26/2024: Discussed in plenary. Determined that this scenario would not be a test failure and no need to add specific scenario. Such scenarios could require consultation with CAA.
68084	Medium	2.4.3.3.1	Practicality Difficulty	The test procedure requires in step d video recording the test article from several angles. Environmental chambers usually are only equipped with a front viewing window and 55C is hard on most cameras. The flickering light from external flames should be visible if recording only from the front even if the flames emit from the back.	Rejected	6/26/2024: Committee wants multiple angles / cameras during test.
68167	Medium	2.4.4	missing notes	Figure only includes one note reference (note 4) but we have 4 notes below figure. Additionally the note numbering has been removed.	Superseded	5/16/24: need to add numbering for notes back. 5/29/24: propose to remove note #4 from figure and update note below to add "Third tests". Need to verify with Antonio. 6/26/24: Updated Figure 2-28 and Note 4.

During Plenary #35, the committee successfully reviewed and resolved 6 comments. The resulting status of all comments is shown below.

Comment Type	Total	Resolved	Percentage	Unresolved	Percentage
Non-Concur	1	1	100.00%	0	0.00%
High	30	30	100.00%	0	0.00%
Medium	124	114	91.94%	10	8.06%
Low	98	93	94.90%	5	5.10%
Editorial	98	96	97.96%	2	2.04%
	351	334	95.16%	17	4.84%

### Requirements Rationale

During the working group meetings, Antonio Chiesa from Transport Canada identified inconsistencies with the requirements rationale throughout the document. As a result, he submitted a proposal of suggested changes to improve the document.

These items continue to be reviewed during working group meetings. As of the close of this Plenary, 35 of the 35 additional items have been reviewed and resolved, leaving 23 open items. It was agreed that these rationale changes continue to be worked and resolved during future working group meetings.

### **DO-227B Final Review and Comment (FRAC) Schedule Update**

John Trela reviewed the schedule progress towards closure of the FRAC process as summarized below. Because the committee was unable to resolve all comments during Plenary #35, it was agreed to continue to use the Working Group meetings to complete this task and schedule an additional Plenary in July with the objective of closing the FRAC.

- Second FRAC Start: 14 Nov 23
- FRAC Comments Due: 12 Jan 24
- Plenary #33 (WDC): 3-7 Mar 24
- Plenary #34 (WDC): 14-16 May 24
- Plenary #35 (Virtual): 26 Jun 24
- Plenary #36 (Virtual): 30 Jul 24 (FRAC Closure – Planned)
- Plenary #37 (Virtual): 13 Aug 24 (Review 227A vs 227B Comparison)
- DO-227B Transmitted to RTCA: Mid Aug 2024
- RTCA PMC Approval: Sep 2024



**Action Item Summary**

There were no new actions generated during Plenary #35:

**Working Group Meetings**

Working Group meetings will continue Mondays and Wednesdays from 10:00am to 12:00pm (Eastern).

**Next Plenary**

Plenary #36 was scheduled for 30 July 2024 as a Virtual Meeting.

-S-  
Jeff Densmore  
Secretary

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

-S-  
John Trela  
Chairman