DANGEROUS GOODS PANEL (DGP)
WORKING GROUP MEETING (DGP-WG/26)

Centurion, South Africa, 26 to 30 October 2026

Agenda Item 4: Managing safety risks posed by the carriage of energy storage devices by air (Ref: Job Card DGP.006)

DRAFT REPORT ON PRELIMINARY DISCUSSION ON HAZARD-BASED CLASSIFICATION SYSTEM FOR LITHIUM ION, SODIUM ION AND LITHIUM METAL CELLS AND BATTERIES DEVELOPED BY THE UN INFORMAL WORKING GROUP (DGP-WG/26-WP/2)

(Presented by the Secretary)

SUMMARY

This information paper provides a report of initial discussion on the UN hazard-based classification system for lithium ion, sodium ion and lithium metal cells and batteries.

1. INTRODUCTION

1.1 DGP-WG/26 had preliminary discussions on proposed amendments to the UN Model Regulations and the UN Manual of Tests and Criteria developed by the UN informal working group on lithium batteries to introduce a hazard-based classification system for lithium ion, sodium ion and lithium metal cells and batteries. The proposed system would assign cells and batteries to one of five categories based on thermal runaway, propagation, gas generation and temperature increase characteristics, supported by new test procedures, UN numbers, packing provisions, hazard communication requirements and controls for transport at a reduced state of charge. The proposals were intended to provide greater granularity for aviation risk assessment and operational decision-making, and the group was invited to identify any gaps concerning the categories, testing and state-of-charge controls, communication of hazard information and implementation in the Technical Instructions before the proposals were considered for finalization by the UN Sub-Committee. The working group was invited to provide comments on the proposed system. These are summarized below.

2. INITIAL COMMENTS

2.1 Overall view

2.1.1 The working group expressed general support for the proposed system and recognized the substantial body of work undertaken by the UN informal working group over approximately ten years. The system provided a more meaningful measure of the intrinsic hazard associated by a cell or battery than the current watt-hour or lithium-content thresholds did. The introduction of a new test that deliberately forces a cell into thermal runaway, to focus on the consequences of such an event, was welcomed. Even a very low probability of thermal runaway remained significant when considering the billions of cells shipped. However, there were some concerns as outlined below

2.2 Granularity for aviation

2.2.1 There was support for retaining the five proposed categories. It was explained that the UN informal working group had taking input from the air mode into account when opting for five rather than four categories. Gas generation was an important factor for the air mode, so the distinction between the different quantities of gas produced that distinguished Category C from Category D was important. The working group considered the five categories to be sufficient for providing granularity for air transport and represented a reasonable balance between granularity and complexity, noting that the number of categories had already been significantly reduced during development of the system and that removing or merging further categories could make the system less transparent for the air mode. It was, however, noted that Category D included both cells that did not undergo thermal runaway at a reduced state of charge and cells that underwent thermal runaway generating less than .25 L of flammable gas, and that it would not be possible to differentiate between these once classified. Whether or not the distinction was important for air transport needed to be considered.

2.2.2 Concern was raised that the proposed system did not distinguish between batteries on their own and batteries packed with equipment and that it did not yet take batteries contained in equipment into account. These factors could create difficulties for the air mode given the different provisions applicable to batteries on their own, packed with equipment and contained in equipment. These were applied based on what the DGP considered to be varying degrees of risk. It was suggested that this should be acknowledged and that consideration be given to how this could be managed, without delaying progress on the proposal.

2.2.3 A question was raised as to whether gas toxicity, and not only gas volume, had been considered, as this could present a risk for air transport. This question remained open.

2.3 UN numbers and state of charge

2.3.1 Knowing the hazard at 100 per cent state of charge was considered critical, even if a reduced state of charge was used to benefit from a less restrictive category. It was clarified that there would be a requirement for the test summary to record both the category at 100 per cent state of charge and the category at the reduced state of charge. While this was acknowledged as a logical approach, it was noted that the test summary was not always readily available and that measures needed to be in place to ensure that it was.

2.3.2 Some members did not support assigning different UN numbers based on the category, as this was not consistent with the treatment of other dangerous goods. Reference was made to entries in the Dangerous Goods List with the same UN number but different packing groups, for which packing requirements were provided in the packing instructions according to the packing group. It was felt like the

same approach should be applied to batteries and cells. It was explained that the committee considered that the use of different UN numbers would result in a less complex system and provide greater visibility to the operator.

2.4 **Test methods and retesting**

2.4.1 Concerns were raised regarding the criteria for determining when retesting would be required following a change in the design of a cell or battery. It was noted that the criteria would permit changes within an established margin without retesting, whereas testing undertaken in the context of the SAE G-27 performance packaging standard had shown that much smaller changes could result in different propagation behaviour at the same state of charge. It was questioned whether a large margin was intended or whether another mechanism would address this risk. It was also noted that the ability to calculate outcomes for cells within batteries during thermal runaway had not yet been resolved within SAE G-27 and required further attention before final responses were provided to the UN informal working group

2.4.2 Concern was expressed regarding reliance solely on the heating method to induce thermal runaway, as there could be batteries that did not enter thermal runaway using this method but could other ways. The hazardous consequences for these batteries and cells would therefore be unknown. It was explained that the rationale for this approach, along with other test criteria, would be included in a rationale document.

2.4.3 Questions were raised on the rationale for the test criteria and on whether a temperature of 150°C was acceptable for air transport. It was explained that this would also be addressed in the rationale document being developed by the UN Sub-Committee.

2.5 **Hazard communication**

2.5.1 Members believed that all categories should require the battery mark, even those with substantial relief, so that packages were still identifiable. For air transport, the question was whether the battery mark alone provided sufficient information or whether documentation should also be required. This remained an open question.

3. CONCLUSION

3.1.1.1.1 Overall, the working group considered the proposed system to be extremely valuable, with the potential to bring significant safety benefits. The Chair emphasized that concerns common to the working group should be brought to the attention of the UN Sub-Committee with the objective of improving the proposal and not to create a new system. The DGP-WG/26 report will capture the common views of the working group based on the discussion of this report. This will be submitted to the UN Sub-Committee by the Secretary.

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