



WORKING PAPER

**DANGEROUS GOODS PANEL (DGP)
WORKING GROUP MEETING (DGP-WG/16)**

Montreal, 17 to 21 October 2016

Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284)* for incorporation in the 2019-2020 Edition

2.4: Part 4 — Packing Instructions

STATE OF CHARGE CLARIFICATION

(Presented by S. Schwartz)

SUMMARY

It is clear that the 30% state of charge limitation for **Lithium ion batteries** (UN 3480) in Packing Instruction 965 applies to batteries as a whole. It is not clear whether it also applies to individual cells within a multi-cell battery.

Action by the DGP-WG: The DGP-WG/16 is invited to consider if clarification is needed as to whether the of state of charge limitation in Packing Instruction 965 applies to the battery as a whole as well as the individual cells that make up a battery or only the battery as a whole.

1. INTRODUCTION

1.1 In 2015 the DGP approved a 30% limitation on the state of charge of lithium ion "cells and/or batteries" (UN 3480) transported by air in Packing Instruction 965. The adopted language is provided in the appendix. It is clear that the limit does apply to an entire battery made up of more than one cell. It is not clear whether this applies to individual cells within a battery as well.

1.2 If the 30% state of charge requirement only applies to battery packs as a whole, and not individual cells, it is possible that a significant number of cells within a battery pack can be charged to a higher state while the entire battery pack remains below the 30% threshold.

1.3 The DGP implemented the state of charge requirement to reduce the likelihood of thermal runaway initiation and propagation in and between lithium ion battery shipments. Since battery

packs can contain large numbers of lithium cells, allowing individual cells in a battery pack at high states of charge will not reduce the local hazard where cells exceed the 30% state of charge.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to consider whether language is needed in Packing Instruction 965 to clarify whether the 30% state of charge limitation applies not only to the battery pack as a whole, but also to cells individually in a battery pack.

APPENDIX

RELEVANT PORTION OF PACKING INSTRUCTIONS 965

Part 4

PACKING INSTRUCTIONS

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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11.1 PACKING INSTRUCTIONS

Packing Instruction 965
Cargo aircraft only for UN 3480

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IA. SECTION IA

Each cell or battery must meet all the provisions of 2;9.3.

IA.1 General requirements

- Part 4;1 requirements must be met.
- Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

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