



WORKING PAPER

**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)

INCLUDING INTO PACKING INSTRUCTION 910 OF THE SUPPLEMENT REQUIREMENTS TO REACH A SAFETY LEVEL TO CARRY CELLS AND BATTERIES THAT HAVE NOT BEEN TESTED TO THE REQUIREMENTS IN PART III, SUBSECTION 38.3 OF THE UN MANUAL OF TESTS AND CRITERIA (TEST T1: ALTITUDE SIMULATION)

(Presented by P. Tatin)

SUMMARY

This working paper invites the panel to consider a means of compliance regarding test T1 (altitude simulation) as per the UN *Manual of Tests and Criteria*, whether cells not tested UN 38.3, or prototype batteries containing lithium cells not certified UN 38.3, are carried by air.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 The depressurization of cargo holds is an event that must be considered by air transport compared to the other modes of transportation.

1.2 According to the test procedure defined in paragraph 38.3.4.1 of the UN *Manual of Tests and Criteria*, cells and batteries shall be stored at a pressure 11.6 kPa or less for at least six hours at an ambient temperature (20 °C +/- 5°C). For your perusal 11.6 kPa is equivalent to an atmospheric pressure at an altitude of 15,000 meters (49,000 ft or FL 490).

1.3 Cells not tested to UN 38.3, or prototype batteries containing cells not certified to UN 38.3, are not tested in altitude simulation. Their resistance to depressurization is undetermined. Safety response must be ensured by the characteristics of the outer packaging. As an example, France requires through its State variation FR 9, the use of an airtight packaging such as a UN drum (Aluminium / Fiber / Other Metal / Plastic / Steel). Furthermore, UN drums are already authorized by Packaging Instruction 910 of the Supplement.

1.4 Other threats such as thermal runaway, vibrations, shock, external short circuit, impact and crush and overcharge (Tests T2 to T7 of the UN *Manual of Tests and Criteria*) are already considered through general and additional requirements in Packing Instruction 910 of the Supplement. As well, the threat “forced discharge” (Test T8) has no impact on transportation by air, as the cells and batteries are disconnected or the equipment containing cells and batteries is switched off.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to:

- a) comment on the draft amendment to Packing Instruction 910 of the Supplement presented in the appendix to this working paper, considering the consequences of an accidental depressurization of cargo holds during flight; and
- b) consider whether there is an interest in further developing the draft amendment in the appendix to this working paper for submission in a working paper to the 2027 Working Group Meeting of the DGP (DGP-WG/27).

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APPENDIX A

AMENDMENT TO THE SUPPLEMENT OF THE TECHNICAL INSTRUCTIONS

Part S-4

PACKING INSTRUCTIONS

(ADDITIONAL INFORMATION FOR PART 4 OF THE TECHNICAL INSTRUCTIONS)

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Chapter 11

CLASS 9 – MISCELLANEOUS DANGEROUS GOODS

Packing Instruction 910

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Introduction

This packing instruction applies to UN Nos. 3090, 3091, 3480, 3481, 3551 and 3552 annual production runs consisting of not more than 100 cells or batteries and to pre-production prototypes of cells or batteries when these prototypes are transported for testing.

General requirements

Part 4, Chapter 1 requirements of the Technical Instructions must be met.

Lithium ion cells and batteries and sodium ion cells and batteries (UN 3480 and UN 3551), including when packed with or contained in equipment (UN 3481 and UN 3552), must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity unless a higher state of charge is specifically approved by the State of Origin and the State of the Operator.

ADDITIONAL PACKING REQUIREMENTS

- Packagings, including large packagings, must meet the Packing Group I performance requirements.
- Pre-production prototype cells, or prototype batteries containing cells that have not been tested to the requirements in Part III, subsection 38.3 of the UN *Manual of Tests and Criteria*, must be packed inside an airtight packaging in order to reach an equivalent level of safety regarding test T1 (altitude simulation) required by the UN *Manual of Tests and Criteria*.

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APPENDIX B

RELEVANT EXTRACTS FROM UN MANUAL OF TESTS AND CRITERIA AND THE TECHNICAL INSTRUCTIONS

The following extracts are provided to support review of this working paper:

UN Manual Test and Criteria

§ 38.3.4.1: Test T.1: Altitude simulation

§ 38.3.4.1.1: Purpose:
This test simulates air transport under low-pressure conditions.

§ 38.3.4.1.2: Test procedure
Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20 +/- 5 °C)

§ 38.3.4.1.3: Requirement
Cells and batteries meet this requirement if there is no leakage, no venting, no disassembly, no rupture and no fire and if the open circuit voltage of each test cell or battery after testing is not less than 90 % of its voltage immediately prior to this procedure. The requirement relating to voltage is not applicable to test cells and batteries at fully discharged states.

Technical Instructions

Special provision A88

A88 Pre-production prototypes of lithium cells or batteries, or sodium ion cells or batteries, when these prototypes are transported for testing or annual production runs of no more than 100 lithium cells or batteries, or sodium ion cells or batteries that have not been tested to the requirements in Part III, subsection 38.3 of the *UN Manual of Tests and Criteria* may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the State of the Operator and the requirements in Packing Instruction 910 of the Supplement are met.

A copy of the document of approval including the quantity limitations must accompany the consignment. Transport in accordance with this special provision must be noted on the dangerous goods transport document.

Irrespective of the limit specified in column 13 of Table 3-1, the cell or battery as prepared for transport may have a mass exceeding 35 kg.

State Variation FR 9

FR 9 In addition to Special Provision A88 from Part 3, Chapter 3:

Except shipments involving packagings not subject to Part 6 of the Technical Instructions as shown through Packing Instruction 910, UN 3090, UN 3091, UN 3480, UN 3481, UN 3551 and UN 3552 involving lithium cells that have not been tested to the requirements in Part III, subsection 38.3 of the *UN Manual of Tests and Criteria* or prototype batteries containing lithium cells that have not been tested to the requirements in Part III, subsection 38.3 of the *UN Manual of Tests and Criteria* must be packed inside a UN drum (Aluminum / Fiber / Other Metal / Plastic / Steel) in order to reach an equivalent of safety level regarding test T1 (altitude simulation) required by the *UN Manual of Tests and Criteria*. Other requirements of Packing Instruction 910 remain unchanged.

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