International Civil Aviation Organization

DGP-WG/26-WP/34
26/10/26

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)

REVISION TO PACKING INSTRUCTIONS 965, 966, 968 AND 969

(Presented by P. Guo)

SUMMARY

This working paper proposes revisions to Packing Instructions 965, 966 and 969 in order to harmonize with the UN Model Regulations.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 At present, Sections IA, IB and II of Packing Instruction 965 of the Technical Instructions all require cells and batteries to be packed in "inner packagings that completely enclose the cell or battery". In practice, this requirement is generally understood as requiring an inner packaging that completely encloses each cell or battery, such as a plastic bag. However, an inner packaging that completely encloses a cell or battery can provide only electrical insulation and prevent external short circuits; it cannot prevent damage to the cells or batteries caused by movement, mutual compression or improper placement within the packaging (such as deformation of the casing, or damage to terminals or pressure-relief devices), and such mechanical damage may equally endanger the safety of air transport.

1.2 In the lithium battery industry, the packaging method most commonly used at present is that shown in Figure 1, in which the cells are secured inside a corrugated outer packaging box by foam dividers and are separated from one another and reliably fixed. Although this method does not involve "completely enclosing" inner packagings, it both ensures effective separation between the cells and between the cells and conductive materials within the same packaging, thereby preventing external short circuits, and fixes the position of the cells, preventing damage caused by the movement or compression of the cells within the packaging; it can therefore meet the dual protection objectives of preventing short circuits and preventing mechanical damage at the same time.



Figure 1 — Example of a non-completely-enclosing packaging method in which the cells are fixed by dividers

1.3 The Sub-Committee of Experts on the Transport of Dangerous Goods (UN-TDG) has held several rounds of discussions on the clarification of the inner packaging requirements in Special Provision 188 of the Recommendations on the Transport of Dangerous Goods, Model Regulations (hereinafter referred to as the "Model Regulations"), as follows:

a) At its sixty-sixth session, the Sub-Committee discussed informal document INF.27. It recognized that the expression "inner packagings that completely enclose" in former paragraph (d) of Special Provision 188 was interpreted differently in practice, that value-chain stakeholders and competent authorities did not have a consistent understanding of the requirement, and that clarification was necessary;

b) At its sixty-seventh session (Geneva, 24 November to 3 December 2025), the Sub-Committee considered official document ST/SG/AC.10/C.3/2025/40, submitted jointly by Canada, France, the Portable Rechargeable Battery Association (PRBA) and the Advanced Rechargeable and Lithium Battery Association (RECHARGE), as well as informal documents INF.24 and INF.54. At that session, most experts supported the amendment in principle, but considered that the wording should be further simplified and should focus on the protection objective rather than on a specific packaging configuration;

c) At its sixty-eighth session (Geneva, 30 June to 8 July 2026), the Sub-Committee considered official document ST/SG/AC.10/C.3/2026/36, and the proposal was adopted as amended (see paragraph 155 of the report of the Sub-Committee on its sixty-eighth session, ST/SG/AC.10/C.3/2026/R.1/Add.5; the text as adopted is set out in the annex to ST/SG/AC.10/C.3/2026/R.2/Add.2).

1.4 The latest text of Special Provision 188 as adopted by the sixty-eighth session of the UN-TDG (former paragraph (d) renumbered as paragraph (f)) reads as follows:

> *"(f) Cells and batteries, except when installed in equipment, shall be packed in strong packagings that conform to the provisions of 4.1.1.1 and 4.1.1.2. Cells and batteries shall be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging;"*

1.5 The above new provision deletes the expression "completely enclosing inner packaging" and no longer prescribes a specific packaging configuration; instead, it clearly sets out the protection objective: cells and batteries must be protected both against short circuits and against damage caused by movement or improper placement within the packaging. This amendment was formally adopted at the sixty-eighth session of the UN-TDG.

1.6 In order to maintain consistency between the Technical Instructions and the Model Regulations, to eliminate the divergent interpretations arising from the "completely enclose" requirement, and to provide a clear basis for industry to use packaging methods that prevent both short circuits and damage caused by movement or compression, it is proposed to amend PI965, PI966, PI968 and PI969.

1.7 The above amendments are consistent with Special Provision 188 (f) of the Model Regulations and do not lower the current level of packaging safety. They eliminate the divergent interpretations of the "completely enclose" requirement, make clear that packaging must achieve the dual protection objectives of preventing short circuits and preventing damage caused by movement or compression, and also help industry to reduce the use of single-use plastic inner packagings and to develop sustainable packaging solutions.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to consider the proposed amendments as shown in the appendix to this working paper for incorporation into the 2029-2030 edition of the Technical Instructions.

— — — — — — — —

APPENDIX

AMENDMENTS TO PART 4 TO THE TECHNICAL INSTRUCTIONS

Part 4

PACKING INSTRUCTIONS

. . .

Chapter 11

CLASS 9 – MISCELLANEOUS DANGEROUS GOODS

. . .

Packing Instruction 965

. . .

IA.2 **Additional requirements**

— Cells and batteries must be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging.
— Cells and batteries must be placed ~~in inner packagings that completely enclose the cell or battery then placed~~ in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
— Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
— A cell or battery with a mass of 12 kg or greater and having a strong, impact-resistant outer casing may be transported when packed in strong outer packagings or protective enclosures (such as in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

. . .

IB.2 **Additional requirements**

— Cells and batteries must be packed ~~in inner packagings that completely enclose the cell or battery then placed~~ in a strong rigid outer packaging which must meet the Packing Group II performance requirements.
— Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
— Cells and batteries must be protected ~~so as to prevent short circuits. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit~~ against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging.
— Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
  — damage to cells or batteries contained therein;
  — shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  — release of contents.
— Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of

24 hours.

Note.— Capability may be demonstrated by testing, assessment or experience.

— Each package must be marked with the battery mark (Figure 5-3) in addition to the appropriate Class 9 hazard label (Figure 5-26) and the cargo aircraft only label (Figure 5-28).

. . .

Packing Instruction 966

. . .

I.2 **Additional requirements**

— Cells and batteries must be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
— Cells and batteries must:
  — be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed in a packaging of a type shown below that meets the Packing Group II performance requirements, then placed with the equipment in a strong, rigid outer packaging; or
  — be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed with the equipment in a packaging of a type shown below that meets the Packing Group II performance requirements.
— The equipment must be secured against movement within the outer packaging.
— The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.

. . .

II.2 **Additional requirements**

— Cells and batteries must:
  — be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1); or
  — be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed with the equipment in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).
— Cells and batteries must be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit.
— The equipment must be secured against movement within the outer packaging.
— The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.
— Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  — damage to cells or batteries contained therein;
  — shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  — release of contents.
— Each package of cells or batteries or the completed package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of 24 hours.

Note.— Capability may be demonstrated by testing, assessment or experience.

. . .

Packing Instruction 968

. . .

IA.2 **Additional requirements**

— Cells and batteries must be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging.
— Cells and batteries must be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
— Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
— A cell or battery with a mass of 12 kg or greater and having a strong, impact-resistant outer casing may be transported when packed in strong outer packagings or protective enclosures (such as in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.

. . .

IB.2 **Additional requirements**

— Cells and batteries must be ~~packed in inner packagings that completely enclose the cell or battery then~~ placed in a strong rigid outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
— Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
— Cells and batteries must be protected so as to prevent damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit.
— Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
  — damage to cells or batteries contained therein;
  — shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  — release of contents.
— Each package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of 24 hours.

Note.— Capability may be demonstrated by testing, assessment or experience.

— Each package must be marked with the battery mark (Figure 5-3) in addition to the appropriate Class 9 hazard label (Figure 5-26) and the cargo aircraft only label (Figure 5-28).

. . .

Packing Instruction 969

. . .

I.2 **Additional requirements**

— Cells and batteries must be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.
— Cells and batteries must:
  — be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed in a packaging of a type shown below that meets the Packing Group II performance requirements, then placed with the equipment in a strong, rigid outer packaging; or
  — be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed with the equipment in a packaging of a type shown below that meets the Packing Group II performance

requirements.
- The equipment must be secured against movement within the outer packaging.
- The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.
- For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
  - cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

. . .

II.2 **Additional requirements**

- Cells and batteries must:
  - be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1); or
  - be ~~placed in inner packagings that completely enclose the cell or battery, then~~ placed with the equipment in a strong rigid outer packaging that conforms to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).
- Cells and batteries must be protected against damage and short circuits that may be caused by the placement or the movement of the cells or batteries within the packaging. This includes protection against contact with electrically conductive material within the same packaging that could lead to a short circuit.
- The equipment must be secured against movement within the outer packaging.
- The number of cells or batteries in each package must not exceed the number required for the equipment's operation, plus two spare sets. A "set" of cells or batteries is the number of individual cells or batteries that are required to power each piece of equipment.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
- Each package of cells or batteries or the completed package must be capable of withstanding, without damage to the cells or batteries contained therein and without any reduction of effectiveness, a force applied to the top surface equivalent to the total weight of identical packages stacked to a height of 3 m (including the test sample) for a duration of 24 hours.

. . .

— END —