



WORKING PAPER

**DANGEROUS GOODS PANEL (DGP)
MEETING OF THE WORKING GROUP OF THE WHOLE**

Auckland, New Zealand, 4 to 8 May 2009

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 2011/2012 Edition

5.3: Review of provisions for dangerous goods relating to batteries

a) lithium batteries

1.2M DROP TEST IN PACKING INSTRUCTIONS 965, 966, 968 AND 969

(Presented by J. Rui)

SUMMARY

This paper proposes an amendment to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) providing test conditions for the 1.2 m drop test required in Packing Instructions 965, 966, 968 and 969.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 The 2009-2010 Edition of the *Technical Instructions* requires a 1.2m drop test for each package prepared in accordance with Packing Instructions 965, 966, 968 and 969 under “Additional packing requirements” as follows:

- 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.

1.2 The relevant packing instruction does not specify the test conditions for the 1.2 m drop test. This results in inconsistent interpretation for the same package depending on how the drop test was conducted and results interpreted.

1.3 Data collected in China indicates that the drop tests have been performed from three to ten possible orientations by different laboratories. Some do the drops for a flat surface of the package, some go for the corner. Results will vary greatly depending on the orientation of the drop test. Another

case is for battery packed with equipment; some labs may drop only the battery package inside, and some may drop the whole package of battery and equipment. It is another reason for getting inconsistent results for the same goods. If one keeps in mind the purpose of the test, which is to simulate the influence of a drop on equipment with the battery inside the package, the equipment could also weaken the battery in case of a drop. As a result, it shall be more appropriate to drop the whole package and not only the battery pack inside. In case the value of equipment is too high for a destructive test an appropriate substitute could be used.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to:

- a) consider replacing the drop test requirement of Packing Instructions 965 and 968 with the following:

Test to be performed on: The completed package of cells or batteries as prepared for transport.

Test purpose: Simulate possible drops during normal transport conditions.

Test procedure: Drop the package from a 1.2 m height by a drop tester according to following requirements:

- for cubic package (for example a box): 5 drops, one each on top surface, bottom surface, long side, short side and a corner;
- for cylindrical package: 5 drops, one each on top plane, bottom plane, surface, top and bottom circumference;
- for other than flat drops, the centre of gravity must be vertically over the point of impact.

Criteria for passing the 1.2 m drop test: Each package must be capable of withstanding the test without:

- damage, leakage, or excessive temperature rise to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact or short-circuit;
- release of contents.

- b) consider replacing the drop test requirement of Packing Instructions 966 and 969 with the following:

Test to be performed on: The package of cells or batteries packed with equipment, as prepared for transport.

Note.— A substitute may be used for the drop test in place of the original equipment provided it has no influence on the package safety, and its size, weight, hardness, setting mode and gravity centre yield similar, or more restrictive, results than if the package was tested with the original equipment.

Test purpose: Simulate possible drops during normal transport conditions.

Test procedure: Drop the package from a 1.2 m height by a drop tester according to following requirements:

- for cubic package: 5 drops one each on top surface, bottom surface, long side, short side and a corner;
- for cylindrical package: 5 drops one each on top plane, bottom plane, surface, top and bottom circumference;
- there is one drop shall be done like that if the equipment is over the battery and could make extra impact to the battery;
- for other than flat drops, the centre of gravity must be vertically over the point of impact.

Criteria for passing the 1.2 m drop test: Each package must be capable of withstanding the test without:

- damage, leakage, or excessive temperature rise to cells or batteries contained therein;
- shifting of the contents so as to allow battery to battery (or cell to cell) contact or short-circuit;
- release of contents.

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