



**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**

**2.4: Part 4 — Packing Instructions**

**2.7: Part 7 — Operator's Responsibilities**

**TRANSPORTATION OF DANGEROUS GOODS IN NON-PRESSURIZED CARGO HOLDS  
AND PRESSURE DIFFERENTIALS IN FLIGHT**

(Presented by M. Rogers)

**SUMMARY**

This paper proposes amendment to the Notes in Part 7 and Part 4 of the Technical Instructions to clarify the pressure differentials to be expected in both pressurized and non-pressurized cargo compartments.

Action by the DGP-WG is in paragraph 2.

**1. INTRODUCTION**

1.1 The Technical Instructions contain notes in Parts 7 and Part 4 addressing the pressure differential that will be experienced by packages in flight. At DGP-WG/08 in The Hague, Netherlands, a proposal was discussed to add specific pressure differential values to the note in 7;2.4.1 and to amend Note 3 in the Introductory Notes in Part 4. Several members requested additional information about the value proposed in the paper and for clarification on the difference between normal and extreme conditions of transport.

1.2 Standard atmospheric pressure at sea level is 100 kPa. At an altitude of 8,000 ft, atmospheric pressure is reduced to 75 kPa, while atmospheric pressure at 33,000 ft will be approximately 25 kPa. This results in a pressure differential seen by a package at 8,000 ft of 25 kPa or a pressure differential of 75 kPa at an altitude of 33,000 ft.

1.3 For pressurized aircraft, the ambient pressure in the cargo compartment is limited to a pressure altitude of 8,000 ft. For non-pressurized aircraft, the ambient pressure in the cargo compartment

will be equivalent to the altitude of the aircraft. Most non-pressurized aircraft cruise at fairly low altitudes (5,000 ft — 15,000 ft). However, several large non-pressurized or partially pressurized aircraft are in service throughout the world, including the Antonov 12 and the Antonov 22. The Antonov 12 has a service ceiling of 33,500 ft (10,200 m), while the partially pressurized Antonov 22 has a service ceiling of 26,240 ft (8,000 m).

## 2. ACTION BY THE DGP-WG

2.1 In order to standardize terminology with the values listed in the pressure differential testing in Part 4 and to clarify the pressure differentials expected to be experienced in normal transportation in pressurized and non-pressurized cargo compartments, the DGP-WG is invited to amend the notes in Part 7 and in Part 4 as follows:

### Part 7

#### OPERATOR'S RESPONSIBILITIES

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##### 2.4 LOADING AND SECURING OF DANGEROUS GOODS

###### 2.4.1 Loading on cargo aircraft

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*Note — When transporting goods in a non-pressurized cargo hold, there will be a large pressure differential up to 75 kPa at high cruise altitudes. Packages that are filled at a normal atmospheric pressure may not be capable of withstanding this pressure differential. Confirmation of the suitability of the packaging from the shipper may be required.*

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### Part 4

#### PACKING INSTRUCTIONS

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##### INTRODUCTORY NOTES

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*Note 3.— Pressure variations*

Due to altitude, the ambient pressure experienced by a package in flight will be lower than standard atmospheric pressure at sea level pressure reductions will be encountered under flight conditions which may in extreme conditions be of the order of 68 kPa. Since receptacles or packagings will generally be filled near sea level at normal a standard atmospheric pressure of approximately 100 kPa, this lower ambient pressure will result in a pressure differential between the contents of the receptacle or package and the cargo compartment. For pressurized cargo compartments, the pressure differential will be approximately 25 kPa, while for non-pressurized cargo compartments, the pressure differential may be as great as 75 kPa. ~~these~~ This pressure differential reductions will tend to cause discharge of liquid contents or bursting of the receptacles or packagings during flight, unless each receptacle or packaging and its closures meet the packaging test requirements.

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