



WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

TWENTY-THIRD MEETING

Montréal, 11 to 21 October 2011

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 2013-2014 Edition

AVALANCHE RESCUE BACKPACK

(Presented by M. Paquette and the Observer from Switzerland)

SUMMARY

This paper proposes to modify the provision for avalanche rescue backpacks when carried by a passenger or crew in Part 8;1.1.2q) of the technical Instructions by including avalanche rescue backpacks that do not contain a pyrotechnic trigger and by referring to the quantity of energy rather than the water capacity of the cylinder.

Action by the DGP: The DGP is invited to modify the existing provision to permit a non-pyrotechnic trigger mechanism and to specify the quantity of energy in the cylinder rather than the water capacity by considering the revision of Part 8 as presented in the Appendix to this WP.

1. INTRODUCTION

1.1 The present provision of Part 8 for the avalanche rescue backpack states:

- q) with the approval of the operator(s), one avalanche rescue backpack per person equipped with a pyrotechnic trigger mechanism containing not more than 200 mg net of Division 1.4S and a cylinder of compressed gas of Division 2.2 not exceeding 250 mL. The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpack must be fitted with pressure relief valves;

1.2 **Pyrotechnic trigger:** Since the provision for avalanche rescue backpacks was introduced in the Technical Instructions, advances in technology have been made to avalanche airbags systems. These new systems no longer use a pyrotechnic trigger but a mechanical system with a cable and a spring, therefore, representing a lower risk in transport. As these new systems represent approximately

50 per cent of the worldwide market, a revision of the existing provision should be considered to allow a non-pyrotechnic trigger mechanism.

1.3 **Water capacity of cylinder:** We have come across a manufacturer who produces one model with a cylinder with a water capacity of 360 mL. This cylinder was selected to contain the same quantity of gas but at a lower pressure. The easy solution, in this instance, would be to increase the water capacity of the cylinder in the provision for avalanche rescue backpacks. However, we believe there is a need to limit the quantity of energy.

1.3.1 The existing provision for avalanche rescue backpacks was written based on the only system available at the time. It refers only to the water capacity of the cylinder rather than the quantity of energy. The quantity of energy is described as the product of the working pressure and water capacity. In this case, the system used a cylinder with a water capacity of 249 mL containing a class 2.2 gas at a working pressure of 30000 kPa (300 bar) — representing an energy of 7470 kPa.Litre (74.7 bar.Litre).

$$\begin{array}{rcccl} \text{Energy} & = & \text{Working Pressure} & \times & \text{Water Capacity} \\ \text{(kPa.Litre)} & & \text{(kPa)} & & \text{(Litre)} \end{array}$$

1.3.2 Since the introduction of this provision, new avalanche airbags systems that use a similar energy have appeared on the market in Europe and in the United States. These systems contain a cylinder with a water capacity greater than 249 mL but contain the same quantity of energy. One system uses a cylinder with a water capacity of 360 mL with a pressure of 20700 kPa (207 bar) representing an energy of 7452 kPa.Litre (74.52 bar.Litre). This energy is lower than the energy of the cylinder that is accepted today.

<u>Energy</u>	<u>Working Pressure</u>	<u>Water Capacity</u>
7470 kPa.Litre	30000 kPa	0.249 L
7452 kPa.Litre	20700 kPa	0.360 L

1.3.3 We have become aware of another system with a working pressure of 34000 kPa (340 bar) and a water capacity of 235mL resulting in an energy of 7990 kPa.Litre (79.90 bar.Litre). Therefore, we have proposed to limit the quantity of energy to 8000 kPa.Litre.

<u>Energy</u>	<u>Working Pressure</u>	<u>Water Capacity</u>
7990 kPa.Litre	34000 kPa	0.235 L

APPENDIX

Part 8

PROVISIONS CONCERNING
PASSENGERS AND CREW

Chapter 1

PROVISIONS FOR DANGEROUS GOODS
CARRIED BY PASSENGERS OR CREW

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1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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1.1.2 Notwithstanding any additional restrictions which may be implemented by States in the interests of aviation security, except for the incident reporting provisions of 7;4.4 or 7;4.5, as applicable, the provisions of these Instructions do not apply to the following when carried by passengers or crew members or in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage) or in excess baggage carried as cargo as permitted by 1;1.1.4.1 g):

...

Consumer articles

...

- q) with the approval of the operator(s), one avalanche rescue backpack per person equipped or not with a pyrotechnic trigger mechanism containing not more than 200 mg net of Division 1.4S and a cylinder of compressed gas of Division 2.2 not exceeding 250 mL having a product of working pressure and water capacity not more than 8000 kPa.L (8b bar.L). The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpack must be fitted with pressure relief valves;

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