International Civil Aviation Organization

DGP-WG/07-WP/67
11/4/07

WORKING PAPER

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

Memphis, 30 April to 4 May 2007

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 2009/2010 Edition
2.4: Part 4 — Packing Instructions

PROPOSED AMENDMENT TO PACKING INSTRUCTION 202 TO ALLOW FOR THE USE OF GLASS RECEPTACLES FOR THE TRANSPORT OF CERTAIN CRYOGENIC LIQUIDS

(Presented by K. Vermeersch)

SUMMARY

This paper proposes an amendment to Packing Instruction 202 to allow for the use of glass receptacles for the transport of certain cryogenic liquids.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 At WG-06 a proposal was made to allow a new concept of a container for the transport of liquid nitrogen and to amend Packing Instruction 202 accordingly (DGP-WG/06-WP/47).

1.2 Although there was general consensus for the principle, comments were made that the requirements should be as short and prescriptive as possible. In addition there was also a general feeling that it would be more convenient to impose Packing Group II performance standards for the packaging instead of the drop test only. In Appendix A you will find a copy of the test report carried out by the Belgian Packaging Institute to demonstrate that the packaging meets Packing Group II performance standards.

1.3 Taking into consideration the above-mentioned comments, a revised proposal is presented to the working group.

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to agree to the following amendment to Packing Instruction 202:

Open cryogenic receptacles

Open cryogenic receptacles

1. Open cryogenic receptacles must be metal or glass vacuum insulated vessels or flasks vented to the atmosphere to prevent any increase in pressure within the package and must be designed and constructed to permit the release of the gas.

2. The use of safety relief valves, check valves, frangible discs or similar devices in the vent lines is not permitted.

3. Receptacles must be equipped with devices which prevent the release of liquid.

4. Fill and discharge openings must be protected against the entry of foreign materials which might increase the internal pressure.

5. The maximum water capacity for metal receptacles is 50 litres~~.~~ and for glass receptacles is 5 litres.

6. The open receptacle must have a secure base and must be designed so that it will remain stable and will not topple under normal conditions of transport.

7. The glass vessel or flask must be protected by shock absorbent material or structure and placed in a strong outer packaging that permits the release of the gas. The package must be designed so that the upright position of the glass vessel or flask is guaranteed under normal conditions of transport.

   Packagings must conform to the requirements of 6;3.1 and must meet Packing Group II performance standards.

~~7.~~8. Open cryogenic receptacles are permitted for nitrogen, argon, krypton and xenon refrigerated liquids.

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APPENDIX A

TEST REPORT CARRIED OUT BY THE BELGIAN PACKAGING INSTITUTE TO DEMONSTRATE THAT THE PACKAGING MEETS PACKING GROUP II PERFORMANCE STANDARDS

IBE - BVI

BELGISCH VERPAKKINGSINSTITUUT bvba
INSTITUT BELGE DE L'EMBALLAGE sprl

DATE : Zellik, 12/10/04

REPORT NR.: SDL/sdl/G-04.184

SUBJECT : Tests on fibreboard boxes (4G), to obtain the authorisation for the transport of dangerous goods of the packaging groups II and III.
Date reception of samples : 19/07/2004
Date testing : 08/10/2004

APPLICANT : **CRYOGENA**
7 Impasse du moulin

F-61250 Damigny

This report is a test report. The use of the boxes is submitted to the authorisation of the competent authority (ADR-RID, IMDG, ICAO

Ing. M. WITTEBOLLE
General Manager

Sven De Leeuw
Analyst-Consultant Packaging Laboratory

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REPORT G-04.184

I. Presented packages

Type of box: American box FEFCO n° 0201, conform the description (4G) as mentioned in the different regulations.

Manufacturer: **Cartonnages du Maine**
ZI SUD
73 Bd. Pierre Piffault
72100 Le Mans

Closure: Adhesive tape

Description of the samples:

Double-wall corrugated fibreboard boxes: detailed description in annex.
The container was filled with liquefied nitrogen.
The central tube was charged supplementary with lead shot to have a heavier gross mass.

Total weight : 4,5 kg
Total weight of the sample : 4,5 kg

Number of received samples

5 filled Boxes
5 empty fibreboard boxes

Composition and characteristics of the fibreboard

see point IV

II. Preconditioning

The samples were preconditioned during 24 hours at a temperature of 23°C and 50% relative humidity.
The samples for drop testing were preconditioned during 24 hours at a temperature of -18°C.

III. Test programm

Performance test for fibreboard boxes (4G) prescribed by :
- UN - Part 6
- IMDG - Part 6
- ICAO - Part 6
- ADR-RID - Part 6

1. Drop test

Filling material	:	see point I (inner packaging)		
Number of tested packagings	:	5		
Drop height	:	1.20 m		
Drop orientation	:	first drop	:	flat on the bottom
		second drop	:	flat on the top
		third drop	:	flat on the long side
		fourth drop	:	flat on the short side
		fifth drop	:	on a corner

Criterion

No damage liable to affect safety during transport.
No important breakage or leakage, nor of the box, nor of the inner packaging

2. Stacking test

Filling material	:	see point I (inner packaging)
Number of tested samples	:	3
Stacking height	:	3 m
Duration of the test	:	24 hours
Stacking load	:	

[(3000/454) -1] x 4,5 ≅ 25 kg

Criterion

No deteriorations which could adversely affect transport safety.
No distortion liable to reduce the strength of the box or to cause unstability in a stack of packages.

IV. Results of the tests

A. Characteristics of the fibreboard

MEASUREMENTS	Unit	
* Weight of the box	g	1122,6
* Dimensions	mm	446 x 446 x 454
* Thickness	mm	6,58
* Weight per m²		
- outer facing (White Top)	g/m²	130
- flute B (Wellenstoff)	g/m²	90
- central facing (Wellenstoff)	g/m²	91
- flute C (Wellenstoff)	g/m²	139
- inner facing (Testliner)	g/m²	136
- total	g/m²	687
* Bursting strength	kPa	1135
* Puncture resistance	kN/m	7,95
* Edge crush resistance	J	7,0
* Water absorption	g/m²	90

B. Drop test

No breakage or leakage

C. Stacking test

No leakage of the filling substance from the inner receptacles.
No test sample shows any deterioration which could adversely affect transport safety.
No distortion liable to reduce the strength of the box or to cause unstability in a stack of packages.

V. Conclusion

The presented packagings have successfully met the performance tests prescribed for the transport of dangerous goods of the packaging groups II and III and may be used in connection with the following conditions :

- maximal stacking height : 3 m
- maximal total weight : 4,5 kg

All other conditions of use are not covered by this report.

The packagings may only be used for the transport of dangerous goods by road, rail, sea or air with the agreement of the concerned competent authority.

Sven De Leeuw
Analyst-Consultant Packaging Laboratory

APPENDIX B

GYROTAINER

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