International Civil Aviation Organization

DGP/22-WP/94
25/9/09
English only

WORKING PAPER

DANGEROUS GOODS PANEL (DGP)

TWENTY-SECOND MEETING

Montréal, 5 to 16 October 2009

Agenda Item 5: Resolution, where possible, of the non-recurrent work items identified by the Air Navigation Commission or the panel:
5.4: Reformatting of the packing instructions

REQUIREMENTS FOR INNER PACKAGINGS

(Presented by D. Brennan)

SUMMARY

This working paper proposes revisions to the provisions applicable to inner packagings as set out in Part 6, Chapter 3 of the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) as a consequence of the adoption of the reformatted packing instructions.

Action by the DGP: The DGP is invited to revise Part 6, Chapter 1 and Part 6, Chapter 3 of the Technical Instructions to remove all reference to IP codes as presented in the Appendix.

1. INTRODUCTION

1.1 Based on decisions taken by the Dangerous Goods Panel at the twenty first meeting of the Panel in November 2007 (DGP/21), the reformatted packing instructions as shown in Attachment 4 of the 2009-2010 edition of the Technical Instructions will be incorporated into the 2011-2012 edition of the Technical Instructions and will become effective 1 January 2011.

1.2 One of the changes agreed by the DGP for inclusion in the reformatted packing instructions is that inner packagings will no longer be referred to by IP codes and instead the terminology will be aligned with the UN Model Regulations and inner packagings will simply be identified by the material from which they are manufactured, e.g. glass, metal, plastic, etc.

1.3 While all of the packing instructions for Classes 3, 4, 5, 8, 9 and Division 6.1 in Attachment 4 have been reformatted to remove reference to IP codes, the changes required to Table 6-3 and Part 6;3.2 to reflect the removal of the IP codes have not yet been agreed.

1.4 In preparing this working paper the provisions of the UN *Recommendations on the Transport of Dangerous Goods* (Model Regulations) were reviewed to identify requirements that apply to inner packagings to ensure that there was no inconsistency between the requirements of the Model Regulations and the text proposed for the Technical Instructions.

1.5 This review identified that the UN Model Regulations contain no requirements for inner packagings along the lines of that contained in 6;3.2 of the Technical Instructions. While the UN Model Regulations make reference to glass, metal, plastic, etc. inner packagings in the applicable packing instructions, there are no requirements with respect to the construction standards as appear in 6;3.2 of the Technical Instructions.

1.6 This then raises two options:

a) maintain the current construction requirements for inner packagings in 6;3.2 and just revise the text to remove reference to IP codes; or

b) delete Table 6-3 and all of 6;3.2 – Requirements for inner packagings.

— — — — — — — —

APPENDIX

AMENDMENTS TO THE TECHNICAL INSTRUCTIONS

Part 6

PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

Chapter 1

APPLICABILITY, NOMENCLATURE AND CODES

. . .

1.2 CODES FOR DESIGNATING TYPES OF PACKAGINGS

~~1.2.1 Two systems of codes are used in these Instructions for designating types of packagings. The first is based on the UN Recommendations, Chapter 6, and is applicable to packagings other than inner packagings. The second is applicable to inner packagings.~~

1.2.~~2~~.1 The code consists of:

— an Arabic numeral indicating the kind of packaging, e.g. drum, jerrican, etc., followed by

— a capital letter(s) in Latin characters indicating the nature of the material, e.g. steel, wood, etc., followed where necessary by

— an Arabic numeral indicating the category of packaging within the kind to which the packaging belongs.

1.2.~~3~~.2 In the case of composite packagings, two capital letters in Latin characters are used in sequence in the second position of the code. The first indicates the material of the inner receptacle and the second that of the outer packaging.

1.2.~~4~~.3 For combination packagings, only the code number for the outer packaging is used.

1.2.~~5~~.4 The following numerals must be used for the kinds of packaging:

1. Drum
2. Reserved
3. Jerrican
4. Box
5. Bag
6. Composite packaging.

1.2.~~6~~5 The following capital letters must be used for the types of material:

A. Steel (all types and surface treatments)
B. Aluminium
C. Natural wood
D. Plywood
F. Reconstituted wood
G. Fibreboard
H. Plastic material
L. Textile
M. Paper, multiwall
N. Metal (other than steel or aluminium)
P. Glass, porcelain or stoneware (not used in these Instructions).

\+ Note.— Plastics materials are taken to include other polymeric materials such as rubber.

1.2.~~7~~6 The letters “T” or “U” or “V” or “W” may follow the packaging code. The letter “T” signifies a salvage packaging conforming to the requirements of 4.8. The letter “U” signifies a special packaging conforming to the requirements of 6.4. The letter “V” signifies a special packaging conforming to the requirements of 4.1.7. The letter “W” signifies that the packaging, although of the same type indicated by the code, is manufactured to a specification different to that in 3.1 and is considered equivalent under the requirements of 1.1.2.

~~1.2.8 The following code is used in these Instructions for designating inner packagings:~~

~~— the capital letters “IP” in Latin characters indicating “Inner Packaging”;~~

~~— an Arabic numeral indicating the kind of inner packaging;~~

~~— where appropriate, a capital letter in Latin characters indicating the category within the kind.~~

1.3 INDEX OF PACKAGINGS

Table 6-2 contains an index of packagings, other than inner packagings, referred to in Chapters 1 to 4. It lists all the packagings, except inner packagings, specified in the United Nations *Recommendations for the Transport of Dangerous Goods*, and notes those not used in these Instructions for air transport. The index lists the number of the paragraph containing the requirements of those packagings used in these Instructions. The performance tests are specified in Chapter 4. Table 6-3 contains an index of inner packagings and lists the paragraph number containing the requirements together with, where applicable, individual performance tests (e.g. for aerosols).

. . .

Table 6-3. Index of inner packagings

~~*Code*~~	~~*Kind*~~	~~*Paragraph*~~
~~IP.1~~	~~Earthenware, glass or wax~~	~~3.2.1~~
~~IP.2~~	~~Plastic~~	~~3.2.2~~
~~IP.3~~	~~Metal cans, tins or tubes (other than aluminium)~~	~~3.2.3.1~~
~~IP.3A~~	~~Metal cans, tins or tubes (aluminium)~~	~~3.2.3.2~~
~~IP.4~~	~~Multiwall paper bags~~	~~3.2.4~~
~~IP.5~~	~~Plastic bags~~	~~3.2.5~~
~~IP.6~~	~~Fibre cans or boxes~~	~~3.2.6~~
~~IP.7~~	~~Metal receptacles (aerosols), non-refillable~~	~~3.2.7.1~~
~~IP.7A~~	~~Metal receptacles (aerosols), non-refillable~~	~~3.2.7.1~~
~~IP.7B~~	~~Metal receptacles (aerosols), non-refillable~~	~~3.2.7.2~~
~~IP.7C~~	~~Plastic receptacle (aerosols), non-refillable~~	~~3.2.8~~
~~IP.8~~	~~Glass ampoules (glass tubes)~~	~~3.2.9~~
~~IP.9~~	~~Metal or plastic flexible tubes~~	~~3.2.10~~
~~IP.10~~	~~Bags, paper with plastic/aluminium~~	~~3.2.11~~

Code	Kind	*Paragraph*
	Glass	3.2.1
	Plastic	3.2.2
	Metal cans, tins or tubes	3.2.3
	Paper bags	3.2.4
	Plastic bags	3.2.5
	Fibre cans or boxes	3.2.6
IP.7	Metal receptacles (aerosols), non-refillable	3.2.7.1

Code	Kind	*Paragraph*
IP.7A	Metal receptacles (aerosols), non-refillable	3.2.7.1
IP.7B	Metal receptacles (aerosols), non-refillable	3.2.7.2
IP.7C	Plastic receptacle (aerosols), non-refillable	3.2.8
	Metal or plastic flexible tubes	3.2.9

. . .

Chapter 3

REQUIREMENTS FOR PACKAGINGS

. . . . . .

3.2 REQUIREMENTS FOR INNER PACKAGINGS

3.2.1 ~~Earthenware, glass or wax (IP.1)~~Glass

Packagings must be well constructed. The materials of which these packagings and closures are made must be of good quality and, where in contact with the substance or article, not liable to react with it. Closures must be sufficiently tight to prevent leaking and sifting. Stoppers or corks must be held securely in position with wire, adhesive tape, or other positive means. Packagings having necks with moulded screw-threads must have threaded-type caps having a resilient liner completely resistant to the contents.

Glass ampoules must be heat-sealed, gas- and liquid-tight and they must not react chemically when coming into contact with the contents. If glass tubes are also permitted by the appropriate national authority for liquefied gases, they must be thickwalled and free of defects.

3.2.2 Plastic ~~(IP.2)~~

Packagings must be well constructed. The materials of which these packagings and closures are made must be of good quality polyethylene or other suitable plastic and, where in contact with the substance, resistant to it. Closures must be sufficiently tight to prevent leaking and sifting. Stoppers or corks must be held securely in position with wire, adhesive tape, or other positive means.

3.2.3 Metal cans, tins or tubes ~~(IP.3 and IP.3A)~~

~~3.2.3.1 *Metal (other than aluminium) IP.3*~~

Packagings must be well constructed~~ and, unless otherwise restricted by the requirements of the packing instructions, the bodies must be made of a metal other than aluminium. Closures may be made of aluminium provided it is compatible both with the contents of the packagings and with the metal(s) used in their construction~~. The materials of which the packagings and closures are made must be of good quality and, where in contact with the substance, not liable to react with it. Closures must be sufficiently tight to prevent leaking and sifting and threaded-type caps must be equipped with a resilient liner completely resistant to the contents of the packagings.

~~3.2.3.2 *Aluminium IP.3A*~~

~~Packagings must be well constructed and the bodies must be made from aluminium. Closures may be made of materials other than aluminium provided they are compatible both with the contents of the packagings and with the aluminium. The aluminium and any other materials of which the closures are made must be of good quality and, where in contact with the substance, not liable to react with it. Closures must be sufficiently tight to prevent leaking and sifting and threaded type caps must be equipped with a resilient liner completely resistant to the contents of the packagings.~~

3.2.4 ~~Multiwall p~~Paper bags ~~(IP.4)~~

Shipping sack kraft paper, or equivalent, of at least two sheets of paper must be used.

3.2.5 Plastic bags ~~(IP.5)~~

The weld-seams and closures of such bags must be siftproof. Plastic bags must have a minimum thickness of 0.1 mm.

3.2.6 Fibre cans or boxes ~~(IP.6)~~

Packagings must be well constructed and the material of which they are made must be of good quality. Metal tops, bottoms and connections, of suitable thickness, are authorized.

3.2.7 Metal receptacles (aerosols), non-refillable (IP.7, IP.7A, IP.7B)

3.2.7.1 *Receptacles (aerosols) IP.7 and IP.7A*

3.2.7.1.1 *Materials and construction.* Uniform quality steel plate or non-ferrous metal of uniform drawing quality must be used:

— IP.7 receptacles must have a minimum wall thickness of 0.18 mm;
— IP.7A receptacles must have a minimum wall thickness of 0.20 mm.

The receptacles may be seamless or with seams welded, soldered, brazed, double-seamed or swaged. The ends must be of pressure design. Maximum capacity must not exceed 820 mL and the maximum inner diameter must not exceed 76 mm.

3.2.7.1.2 *Performance test.* One out of each lot of 25 000 or less receptacles successively produced per day must be pressure-tested to destruction:

— IP.7 receptacles must not burst below 1 650 kPa gauge pressure;
— IP.7A receptacles must not burst below 1 860 kPa gauge pressure.

3.2.7.2 *Receptacles (aerosols) IP.7B*

3.2.7.2.1 *Materials and construction.* Uniform quality steel plate or non-ferrous metal of uniform drawing quality must be used. The receptacles may be seamless or with seams welded, soldered, brazed, double-seamed or swaged. The ends must be of pressure design. Maximum capacity must not exceed 1 000 mL and the maximum inner diameter must not exceed 76 mm. The aerosol, including its valve, must be virtually hermetically sealed under normal conditions of transport and the valve must be suitably protected to prevent actuation during transport.

3.2.7.2.2 Performance tests required:

— hydraulic pressure test;
— bursting test;
— leakage test.

3.2.7.2.3 *Hydraulic pressure test.* Number of samples: six receptacles.

Method of testing and pressure applied: the pressure must be applied slowly. The test pressure must be 50 per cent higher than the internal pressure at 50°C but at least 1 000 kPa. The test pressure must be applied for 25 seconds.

Criteria for passing the test successfully: the receptacle must not show major distortions, leaks or similar faults, but a slight symmetrical distortion of the base, or one affecting the profile of the top end shall be allowed, provided that the receptacle passes the bursting test.

3.2.7.2.4 *Bursting test.* Number of samples: six receptacles; these may be the same receptacles used in the hydraulic pressure test.

Method of testing and pressures applied: a hydraulic pressure at least 20 per cent higher than the test pressure as mentioned in 3.2.7.2.3 must be applied.

Criteria for passing the test successfully: no receptacle may leak.

3.2.7.2.5 *Leakage test.* Number of samples: every aerosol.

Method of testing: each aerosol must be immersed in a bath of water. The temperature of the water and the duration of the test must be such that the internal pressure reaches that which would be reached at 55°C, or 50°C if the liquid phase does not exceed 95 per cent of the capacity of the aerosol at 50°C. When an aerosol is sensitive to heat, the temperature of the bath may be set at between 20°C and 30°C in which case one receptacle in 2 000 must be tested at the higher temperature.

Equally effective methods of testing may also be used.

Criteria for passing the test successfully: the aerosol must not show visible permanent distortions or any leakage.

3.2.8 Plastic receptacles (aerosols) non-refillable (IP.7C)

3.2.8.1 *Receptacles (aerosols) IP.7C*

≠ 3.2.8.1.1 *Materials and construction*. The receptacle must be of polyethylene terephthalate (PET), polyethylene napthalate (PEN), polyamide (Nylon), or a blend containing some combination of PET, PEN, ethyl vinyl alcohol (EVOH) and Nylon. Thermoplastic processes ensuring uniformity of the completed container shall be applied. No used material other than production residues or re-grind from the same manufacturing process may be used. The packaging shall be adequately resistant to aging and to degradation caused either by the substance contained or by ultraviolet radiation. Maximum capacity must not exceed 500 mL.

3.2.8.1.2 Performance tests required:

— drop test;
— hydraulic pressure test;
— bursting test;
— leakage test.

3.2.8.1.3 *Drop test*. Method of testing: to ensure that creep does not affect the ability of the receptacle type to retain the contents the receptacles shall be dropped as follows: three groups of twenty-five filled receptacles shall be dropped from 1.8 m on to a rigid, non-resilient, flat and horizontal surface. One group must be conditioned at 38°C for 26 weeks, the second group for 100 hours at 50°C and the third group for 18 hours at 55°C, prior to the drop test.

Criteria for passing the test successfully: the receptacle must not break or leak.

3.2.8.1.4 *Hydraulic pressure test.* Number of samples: six receptacles.

Method of testing: receptacles must resist a test pressure equal to at least 1 200 kPa.
Criteria for passing the test successfully: the receptacle must not show major distortions, leaks or similar faults, but a slight symmetrical distortion of the base, or one affecting the profile of the top end, shall be allowed, provided that the receptacle passes the bursting test.

3.2.8.1.5 *Bursting test*. Number of samples: six. These may be the same receptacles used in the hydraulic pressure test.

Method of testing and pressures applied: a hydraulic pressure at least 20 per cent higher than the test pressure as mentioned in 3.2.8.1.4 must be applied.

Criteria for passing the test successfully: the receptacle must not leak.

3.2.8.1.6 *Leakage test*. Every aerosol. A leakage test in accordance with 6;5.4.2.2.2 or 6;5.4.3 approved by the competent authority ~~shall~~ must be used.

~~**3.2.9 Glass ampoules (glass tubes) (IP.8)**~~

~~The ampoules must be heat-sealed, gas- and liquid-tight and they must not react chemically when coming into contact with the contents. If such glass tubes are also permitted by the appropriate national authority for liquefied gases, they must be thick-walled and free of defects.~~

3.2.~~10~~9 Metal or plastic flexible tubes ~~(IP.9)~~

The materials of construction of flexible tubes and their closures must, where in contact with the organic peroxide, not affect the thermal stability.

~~**3.2.11 Bags, paper with plastic/aluminium (IP.10)**~~

~~The bags must be multiwall paper bags lined with plastic and/or aluminium. The weld-seams and closure must be siftproof.~~

— END —