International Civil Aviation Organization

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WORKING PAPER

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

Beijing, China, 25 October to 3 November 2006

Agenda Item 6: Discussion of miscellaneous dangerous goods issues

UN WORKING PAPERS FOR DECEMBER 2006 MEETING

(Presented by the Secretary)

SUMMARY

This paper presents seeks guidance from the working group on proposed amendments to the UN Model Regulations contained in working papers for the thirtieth session of the UNSCOE.

Action by the DGP-WG is in paragraph 2.

1. INTRODUCTION

1.1 The attached working papers contain proposals for amendment to the UN Model Regulations at the thirtieth session of the UNSCOE (4 to 12 December, 2006).

Appendix A — Packing Instruction P099
Appendix B — Exemption for small quantities of pharmaceutical research and development substances
Appendix C — Fuel cell cartridges containing Division 2.1 substances
Appendix D — New entries for lithium ion batteries
Appendix E — General definition of "freight container" in Chapter 1.2
Appendix F — Proposed amendment of lithium ion battery size limit in SP 188
Appendix G — Special provision 188 concerning lithium batteries
Appendix H — 1.1.5: Exceptions for dangerous goods packed in limited quantities
Appendix I — Excepted quantities

2. ACTION BY THE DGP-WG

2.1 The DGP-WG is invited to provide guidance to the Secretary on these proposals.

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COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS AND ON THE GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS

Sub-Committee of Experts on the
Transport of Dangerous Goods

Thirtieth session
Geneva, 4-12 (a.m.) December 2006
Item 2(a) of the provisional agenda

PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Model Regulations on the Transport of Dangerous Goods

Packing Instruction P099

Transmitted by the expert from Australia

Introduction

1. During the 29th, session Australia submitted UN/SCETDG/29/INF.48 detailing concerns related to the application of P099 in regards to international multimodal transport of dangerous goods. As noted in paragraphs 106 to 108 of the report of the 29th session of the Sub-Committee (ST/SG/AC.10/C.3/58) questions were raised in respect of the legal recognition of Competent Authority approvals by administrations other than that from where the shipment originated, noting this is handled differently in the ADR. There was general agreement at the meeting on the need to amend P099, and Australia was asked to resubmit the proposal, allowing other experts time to provide additional comments.

Implementation of P099

2. In respect of sea transport, regulation VII/3 of the SOLAS convention makes all dangerous goods transported by sea subject to the IMDG code. This code is structured on the UN Model Regulations and copies its provisions. However, additional requirements are included that relate to sea transport, in the same manner as the ADR is modified for land transport requirements. In regards to P099 the IMDG code copies directly from the UN Model Regulations while the ADR includes all of the text with the exception of the text in parenthesises, "(*see 4.1.3.7*)".

3. Similarly, the IMDG code copies section 4.1.3.7 directly from the UN Model Regulations, while the ADR has modified the text to reflect that packagings or IBC's not specifically authorised in the particular packaging instruction shall not be used unless specifically allowed under a temporary approval agreed between contracting parties. Arrangements to deal with variations to the IMDG code are contained in chapter 7.9. This chapter states that approvals issued under the IMDG code by a contracting party to the SOLAS convention, other than multilateral approvals, will normally be accepted by other contracting administrations. However, where an exemption is issued (such as an alternative packaging) it is subject to the discretion of any contracting party that may be affected by it.

Background

4. As noted in UN/SCETDG/29/INF.48, a number of shipments of Nitromethane (UN1261) have been received in Australia and subsequently transhipped to other countries after being stored for a period. When the consignments were being prepared for their subsequent shipment the consignor approached the Australian competent authority for sea transport seeking clarification of the requirements in respect of packing instruction P099.

5. Subsequent investigations revealed that no documentation had been provided in respect of the original shipment as required by Packing Instruction P099. This seems contrary to the intent of the wording in UN Model Regulations, the IMDG Code and the ADR. Further the Australian consignor was unable to obtain any evidence that the country of origin had approved the packages as required by Packing Instruction P099. As a result, the Australian Competent Authority had to conduct its own investigations and issue an approval for the subsequent shipment of these goods.

Issues

6. The situation in respect of the Nitromethane (UN1261) shipments are used as examples but there are other incidents involving other commodities. Since UN/SCETDG/29/INF.48 was submitted Australia has been targeting UN1261 and has found that the approach to P099 is very inconsistent, depending on the origin of the shipment. It appears that some consignors consider that any approval in respect of a package for the carriage of dangerous goods, issued in respect of chapter 6.1, is sufficient in respect of complying with Packing Instruction P099.

7. While this approach is inconsistent with the wording of Packing Instruction P099 and its reference to section 4.1.3.7, it is possible that consignors are misconstruing the wording of 4.1.3.7 given the reference to 'alternative packaging' and as such do not believe a specific approval is required. It is also noted, as raised during discussions in the 29th session that the same issues exist for IBC99 and TP9. However, it is not an issue for tank instructions as special tank instruction TP9, as written in the UN Model Regulations, already makes specific reference to the substance and a specific approval. Australia believes that a simple amendment to Packing Instruction P099 and IBC 99 would clarify the requirement for the approval to accompany the shipment and result in fewer incidents of confusions regarding such shipments.

Proposal

8. As proposed in UN/SCETDG/29/INF.48 it is recommended Packing Instruction P099 be modified to remove any doubt that a specific Competent Authority approval is required. Noting the comments made at 106 to 108 of ST/SG/AC.10/C.3/58, it is recommended that P099 be modified to add a requirement that the approval for the packaging must be specific to the commodity being carried and evidence of such an approval must be demonstrated in the transport document or must accompany the shipment. This addresses the intent of the reference to 4.1.3.7. While this repeats the request mentioned in 4.1.3.7, it should provide further clarity to consignors. Proposed text is as follows:

P099	**PACKING INSTRUCTION**	**P099**
Only packagings which are approved *for these goods* by the competent authority may be used (see 4.1.3.7). A copy of the competent authority approval is to accompany each consignment or the transport document includes an indication that the packaging was approved by the competent authority.		

9. Noting the comments made during discussions in the 29th session, it is also proposed that IBC99 be modified in the same manner as proposed for Packing Instruction P099. Proposed text is as follows:

IBC99	**PACKING INSTRUCTION**	**IBC99**
Only packagings which are approved *for these goods* by the competent authority may be used (see 4.1.3.7). A copy of the competent authority approval is to accompany each consignment or the transport document includes an indication that the packaging was approved by the competent authority.		

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Limited quantities

Exemption for small quantities of pharmaceutical research and development substances

Transmitted by the International Council of Chemical Associations (ICCA)
and the Dangerous Goods Advisory Council (DGAC)

Background

1. At the twenty-ninth session of the Sub-Committee, ICCA and DGAC presented a proposal to provide an exemption in the Model Regulations for small quantities of pharmaceutical research and development substances (ST/SG/AC.10/C.3/2006/49).

2. As noted in the report of the session (ST/SG/AC.10/C.3/58, para. 48), a number of delegations supported the principle of such an exemption but raised issues regarding substances included in Packing Group I, the maximum quantity per package or per vehicle, the classification principles in 2.0.4.1, a possible link with work on excepted quantities and conditions of transport in packagings containing dry ice.

3. The pharmaceutical industry ships thousands of small quantities of substances annually (typically in amounts less than or equal to 0.2 g for solids or 0.2 ml for liquids, and usually in a

non dangerous medium) in their efforts to discover innovative therapies for human afflictions such as cardiovascular disease, metabolic and infectious disease, and cancer. The primary facilities involved in supporting their research activities include, but are not limited to, hospitals, universities, research and analytical laboratories, and clinics, a number of which operated by state and federal government agencies. The number of shipments will increase over the coming years as the globalization of research and development intensifies.

4. Many substances shipped by the industry are novel compounds. Some have been synthesized in quantities totalling no more than two or three grams at a cost of many thousands of dollars. While most compounds are non dangerous, in the absence of complete classification profiles, compounds are conservatively classified in accordance with the procedures for samples described in paragraph 2.0.4 of the Model Regulations.

5. The desired therapeutic properties of these compounds (i.e., they are developed to provide a health benefit) suggest and testing confirms that most do not meet the criteria for classification as dangerous goods. Of the compounds that do meet the criteria, most fall within Division 6.1, Packing Group III. An analysis of one company's compounds that advanced to a research stage (their therapeutic properties justify further development) showed the following:

	NUMBER OF COMPOUNDS	**PERCENT OF TOTAL**
Current Number of research compounds in active development that are classified for transport	**1547**	**---**
Of those, the total number classified in Division 6.1	**241**	**15.6**
Of those, the total number classified in Division 6.1, PG I	**3**	**0.19**

6. The low danger levels of most compounds evaluated in pharmaceutical research and development efforts and the quantity and form of these compounds suggests that shipments, including shipments of novel compounds with incomplete classification profiles, in quantities of less than or equal to 0.2 g or 0.2 ml per inner receptacle, present an insignificant risk under any conditions of transport. On this basis it is proposed that they not be subject to the dangerous goods regulations if proposed conditions are met.

7. Bearing in mind the comments from experts at the twenty-ninth session, the proposal has been changed:

(a) to differentiate the proposal from provisionally accepted requirements for excepted quantities by reducing the quantity of substance per inner packaging to less than or equal to 0.2 g or 0.2 ml - one fifth the size of the upper limit for excepted quantities at the packing group I level even though the vast majority do not meet the criteria for packing group I;

(b) to differentiate between the pharmaceutical research and development substances and samples addressed in 2.0.4.1 by providing a new 2.0.5;

(c) to recognise that some substances may meet criteria for Packing Group I;

(d) to eliminate reference to dry ice, since dry ice, when it is used as a coolant, is in an overpack and not in the actual package containing the pharmaceutical substances and is, therefore, subject to existing transport requirements for dry ice; and

(e) to reduce the maximum quantity per package from 500 g or 500 ml to 100 g or 100 ml. An overall package gross mass limit was not deemed necessary since the quantity of substance is already limited and any limit on the overall mass would only serve to limit the amount of packaging material.

Given industry practice of shipping only a few packages in a consignment and the small quantity of substance present, including a maximum number of packages per vehicle was considered unnecessary.

Proposal

8. Introduce the following new paragraph in Chapter 2.0:

"2.0.5 Transport of substances for pharmaceutical research and development

Pharmaceutical research and development substances developed to investigate their potential as medicines are not subject to any other requirements of these Regulations under the following conditions:

(a) this provision shall only apply to substances classified as Division 6.1, Packing Group I**,** II or III for oral or dermal toxicity based on available information and shall not meet any other criteria for classification as dangerous goods;

(b) the net quantity of substance under investigation per inner package shall be less than or equal to 0.2 g for solids or 0.2 ml for liquids. Substances under investigation may be held in a medium not subject to these Regulations;

(c) the aggregate quantity of substances under investigation per package shall not exceed 100 g or 100 ml.

(d) packagings shall meet the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.4, 4.1.1.4.1, 4.1.1.6 and 4.1.1.8.1;

(e) inner packagings must be packed in outer packagings with sufficient absorbent cushioning material to prevent movement and to absorb the entire contents. Absorbent cushioning material shall be of a type that will not react with the substances. For solid substances, cushioning material need not be absorbent;

(f) each inner packaging shall be fitted with a closure securely held in place by positive means; and

(g) the outer package and an accompanying document shall include the name and telephone number of a person who can be contacted for information while the package is in transport.

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Fuel cell cartridges containing Division 2.1 substances

Transmitted by the expert from Canada

Referenced documents from the 29th session:
ST/SG/AC/10/C.3/2006/58/Add.1
ST/SG/AC.10/C.3/2006/50
UN/SCETDG/29/INF.11
UN/SCETDG/29/INF.15
UN/SCETDG/29/INF.58
UN/SCETDG/29/INF.68

Background

1. At its twenty-ninth session the Sub-Committee adopted new entries for fuel cells and cartridges containing Division 4.3 and Class 8 substances (ST/SG/AC.10/C.3/2006/58/Add.1) and agreed to consider additional new entries for fuel cells and cartridges containing liquefied gases and hydrogen in metal hydrides. The expert from Canada agreed to provide a revised

proposal for new entries for these fuel cells and cartridges taking into account the decisions already made for Class 3, Class 8 and Division 4.3 fuel cell cartridges and papers submitted to the 29th session (ST/SG/AC.10/C.3/2006/50 by the United States of America and France, UN/SCETDG/29/INF.11 by Canada and UN/SCETDG/29/INF.15 by Dangerous Goods Advisory Council (DGAC) and US Fuel Cell Council (USFCC), and the report of the fuel cell lunch hour working group UN/SCETDG/29/INF.68). In preparing this proposal, the expert from Canada also endeavoured to take into account comments from other delegations through intersessional communications.

ISO TS 16111

2. At the 29th session the representative from ISO noted that ISO TS 16111, which covers the requirements applicable to the design, construction and filling of transportable gas storage devices containing hydrogen in metal hydrides, had been distributed for voting and, should the vote be favourable, could be issued as a Technical Specification as early as mid September 2006 (the text of ISO TS 1611 is provided in UN/SCETDG/29/INF.58). The proposal in this document is based on the assumption that ISO TS 16111 will be issued before the Sub-Committee's 30th session in December 2006.

3. Should the ISO TS 16111 not be completed before December 2006, a special provision, 3CC, is provided in the Annex to this paper specifying the relevant requirements from ISO TS 16111 for fuel cell cartridges with a water capacity less than or equal to 120 ml and requiring that fuel cell cartridges with a larger water capacity be subject to approval by the competent authority. The 120 ml limit also appears in ISO TS 16111 and is the volume limit to which the requirements in the special provision in the Annex are applicable. While this special provision is quite lengthy, it would likely only be in the UN Model Regulations for a two-year period pending completion of ISO TS 16111.

Revision of SP 328

4. In this paper an addition to the last sentence of the first paragraph of special provision 328 is proposed to clarify that no leakage of the content of the cartridge in any configuration for transport is acceptable.

In addition, a minor amendment is proposed to the text of special provision 328 which was adopted at the 29th session. This amendment acknowledges that fuel cell cartridges containing hydrogen in metal hydride are already subject to a more severe series of drop tests under ISO TS 16111 or the special provision provided in the annex to this paper.

Production leak testing

5. This paper proposes that fuel cell cartridges containing liquefied gas or hydrogen in metal hydride be subjected to a production leak test.

For fuel cell cartridges containing liquefied gas, this paper proposes to require the water bath test currently prescribed for similar articles transported under UN 2037, Receptacles, Small, Containing Gas, and changes to Chapter 6.2 are included in this proposal.

For fuel cell cartridges containing hydrogen in metal hydride, a production leak test is already required in ISO TS 16111. A similar test requirement is included in special provision 3CC in the annex should the ISO TS 16111 not be adopted in time for the 30th session.

Limited Quantity Values

6. Values of 120 ml are proposed as limited quantity values for the two types of gas entries. For fuel cell cartridges containing liquefied gas this limit is substantially more conservative than the one litre limit for UN2037, Receptacles, Small, Containing Gas, under which similar and even higher pressure gases could be transported. In addition, a new special provision, 3BB, specifies a minimum design pressure for fuel cell cartridges containing liquefied gas of two times the vapour pressure of the gas at 55 °C.

7. The expert from Canada believes that a limited quantity value of 120 ml for fuel cell cartridges containing hydrogen in metal hydride that are in compliance with the rigorous requirements of ISO TS 16111 or the special provision in the Annex to this paper, 3CC, is appropriate. Metal hydrides offer a safe means of containing hydrogen in a fuel cell cartridge. The hydrogen is absorbed into the metal hydride and even when exposed to the atmosphere is only released slowly. Further, as hydrogen gas is desorbed, the metal hydride cools, requiring additional input of heat to release more gas, thus precluding rapid release.

Proposal

8. Based on the above discussion, the following amendments are proposed.

9. Add the following new entries to the Dangerous Goods List

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
WWWW	FUEL CELL CARTRIDGE; or FUEL CELL CARTRIDGE CONTAINED IN EQUIPMENT; or FUEL CELL CARTRIDGE PACKED WITH EQUIPMENT, containing liquefied flammable gas	2.1			328 3BB	120ml	P004			
XXXX	FUEL CELL CARTRIDGE; or FUEL CELL CARTRIDGE CONTAINED IN EQUIPMENT; or FUEL CELL CARTRIDGE PACKED WITH EQUIPMENT, containing hydrogen in metal hydride	2.1			328 3CC	120ml	P004			

10. Revise Special Provision 328 as follows (proposed text is underlined):

"328 This entry applies to fuel cell cartridges including when contained in equipment or packed with equipment. Fuel cell cartridges installed in or integral to a fuel cell system are regarded as contained in equipment. Fuel cell cartridge means an article that stores fuel for discharge into the fuel cell through a valve(s) that controls the discharge of fuel into the fuel cell. Fuel cell cartridges, <u>including when contained in equipment</u>, shall be designed and constructed to prevent fuel leakage under normal conditions of transport.

Fuel cell cartridge design types using liquids as fuels shall pass an internal pressure test at a pressure of 100 kPa (gauge) without leakage.

<u>Except for fuel cell cartridges containing hydrogen in metal hydride which shall be in compliance with ISO TS 16111,</u> each fuel cell cartridge design type shall be shown to pass a 1.2 meter drop test onto an unyielding surface in the orientation most likely to result in failure of the containment system with no loss of contents."

11. Add a new special provision for fuel cell cartridges containing liquefied gas as follows:

"3BB Each fuel cell cartridge transported under this entry and designed to contain a liquefied flammable gas shall:

(a) be capable of withstanding, without leakage or bursting, a pressure of at least two times the equilibrium pressure of the contents at 55 ºC;

(b) not contain more than 200 ml of liquefied flammable gas with a vapour pressure not exceeding 1 000 kPa at 55 ºC; and

(c) for each unit placed in transport, pass the hot water bath test prescribed in 6.2.4.1 of Chapter 6.2."

12. Add a new special provision for cartridges containing hydrogen in a metal hydride:

"3CC Fuel cell cartridges containing hydrogen in a metal hydride shall be in compliance with
ISO TS 16111 (2006) and, except during the fire test, shall pass all the required tests without leakage.

Fuel cell cartridges containing hydrogen in a metal hydride which are transported as limited quantities in accordance with Chapter 3.4 shall have a water capacity less than or equal to 120 ml and shall not contain more than 25 g of hydrogen."

13. Revise the title of Chapter 6.2 to read:

REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF PRESSURE RECEPTACLES, AEROSOL DISPENSERS, RECEPTACLES CONTAINING GAS (GAS CARTRIDGES), AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

14. Revise the Note in 6.2.1 to read:

NOTE: For aerosol dispensers, small receptacles containing gas (gas cartridges), and fuel cell cartridges containing liquefied flammable gas, see 6.2.4.

15. Revise the title of 6.2.4 to read:

Requirements for aerosol dispensers and small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas.

16. Revise the title of 6.2.4.1 to read:

Small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas

17. Revise 6.2.4.1.1 and 6.2.4.1.2 to read:

6.2.4.1 Each receptacle or fuel cell cartridge shall be subjected to a test performed in a hot water bath; the temperature of the bath and the duration of the test shall be such that the internal pressure reaches that which would be reached at 55 °C (50 °C if the liquid phase does not exceed 95% of the capacity of the receptacle or the fuel cell cartridge at 50 °C). If the contents are sensitive to heat or if the receptacles or the fuel cell cartridges are made of plastics material which softens at this test temperature, the temperature of the bath shall be set at between 20 °C and 30 °C but, in addition, one receptacle or fuel cell cartridge in 2000 shall be tested at the higher temperature.

6.2.4.1.2 No leakage or permanent deformation of a receptacle or fuel cell cartridge may occur, except that a plastics receptacle or fuel cell cartridge may be deformed through softening provided that it does not leak.

Annex

Special provision 3CC

The proposed special provision 3CC would read as follows in the event that ISO TS 16111 is not published in time for consideration by the Sub -Committee at its 30th session.

3CC Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry shall have a water capacity less than or equal to 120 ml and shall not contain more than 25 g of hydrogen. Fuel cell cartridges exceeding this water capacity or quantity of hydrogen may only be transported with competent authority approval.

The pressure in the fuel cell cartridge shall not exceed 5 MPa at 55 °C. The design type shall withstand, without leaking or bursting, a pressure of two (2) times the design pressure of the cartridge at 55 ºC or 200 kPa more than the design pressure of the cartridge at 55 °C, whichever is greater. The pressure at which this test is conducted is referred to in the Drop Test and the Hydrogen Cycling Test as the "minimum shell burst pressure".

Fuel cell cartridges shall be filled in accordance with procedures provided by the manufacturer. The manufacturer shall provide the following information with each fuel cell cartridge:

(a) inspection procedures to be carried out before initial filling and before refilling of the fuel cell cartridge;

(b) safety precautions and potential hazards to be aware of;

(c) method for determining when the rated capacity has been achieved;

(d) minimum and maximum pressure range;

(e) minimum and maximum temperature range; and

(f) any other requirements to be met for initial filling and refilling including the type of equipment to be used for initial filling and refilling.

The fuel cell cartridges shall be designed and constructed to prevent fuel leakage under normal conditions of transport. Each cartridge design type, including cartridges integral to a fuel cell, shall be subjected to and shall pass the following tests:

Drop test

A 1.8 metre drop test onto an unyielding surface in four different orientations:

(a) vertically, on the end containing the shut-off valve assembly;

(b) vertically, on the end opposite to the shut-off valve assembly;

(c) horizontally, onto a 38 mm steel apex, with the steel apex in the upward position; and

(d) at a 45° angle on the end containing the shut-off valve assembly.

There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations, when the cartridge is charged to its rated charging pressure. The fuel cell cartridge shall then be hydrostatically pressurized to destruction. The recorded burst pressure shall exceed 85% of the minimum shell burst pressure.

Fire test

A fuel cell cartridge filled to rated capacity with hydrogen shall be subjected to direct flame impingement. The cartridge design, which may include a vent feature integral to it, is deemed to have passed the fire test if

(a) the internal pressure vents to zero gauge pressure without violent rupture of the cartridge; or

(b) the cartridge withstands the fire for a minimum of 20 minutes without rupture.

Hydrogen cycling test

This test is intended to ensure that a fuel cell cartridge design stress limits are not exceeded during use.

The fuel cell cartridge shall be cycled from not more than 5% rated hydrogen capacity to not less than 95% rated hydrogen capacity and back to not more than 5% rated hydrogen capacity. The cycling shall be continued for at least 100 cycles.

Following the cycling test, the fuel cell cartridge shall be charged and the water volume displaced by the cartridge shall be measured. The cartridge design is deemed to have passed the hydrogen cycling test if the water volume displaced by the cycled cartridge does not exceed the water volume displaced by an uncycled cartridge charged to 95% rated capacity and pressurized to 75% of its minimum shell burst pressure.

Production leak test

Each fuel cell cartridge shall be tested for leaks at 15 ºC ±5 ºC, while pressurized to its rated charging pressure. There shall be no leakage, determined by using a soap bubble solution or other equivalent means on all possible leak locations.

Each fuel cell cartridge shall be permanently marked with the following information:

(a) the rated charging pressure in megapascals (Mpa);

(b) the manufacturer's serial number of the fuel cell cartridges or unique identification number; and

(c) the date of expiry based on the maximum service life (year in four digits; month in two digits).

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Model Regulations on the Transport of Dangerous Goods

New entries for lithium ion batteries

Transmitted by the International Federation of Air Line Pilots Association (IFALPA)

1. At its twenty-ninth session, the Sub-Committee considered a proposal by the Portable Rechargeable Battery Association (PRBA) to assign lithium ion cells and batteries a distinct UN Number (ST/SG/AC.10/C.3/2005/45). While this proposal was not adopted, IFALPA believes that transport safety would be enhanced by a distinct UN Number for lithium ion cells and batteries (hereafter referred to as lithium ion batteries), and is resubmitting a revised version of the PRBA proposal, accompanied by additional safety justification.

Justification for new UN numbers and proper shipping names for lithium ion batteries

2. Lithium metal batteries and lithium ion batteries are distinctly different products, both chemically and functionally. Lithium metal batteries are generally non-rechargeable (primary), and are used in many consumer and medical applications, including digital cameras, flashlights, and defibrillators. They are also used extensively by the military and aerospace industry. Lithium ion batteries are rechargeable, and are the preferred technology for many portable consumer electronic products and power devices, including portable computers, mobile

telephones and MP3 players. Larger lithium ion batteries also are being developed for use in battery powered (electric) vehicles and hybrid vehicles.

Both products contain lithium, but at different oxidation states, making them chemically very different. Just as table salt (NaCl) is very different chemically from metallic sodium (Na), the lithium ion compound used in lithium ion batteries is chemically very different from the metallic lithium used in lithium metal batteries. The UN Manual of Tests and Criteria correctly observes that a lithium ion cell or battery is constructed with no metallic lithium in either electrode, making them much less chemically reactive, thus justifying distinct entries for lithium metal and lithium ion batteries.

3. When evaluating this proposal, the Sub-Committee is asked to consider the different requirements for *batteries, containing sodium* (UN 3292) and a battery where sodium hydroxide was used as an electrolyte. Sodium is present in both batteries, albeit at different oxidation states. While batteries conforming to UN 3292 are forbidden for transport on passenger aircraft, a battery containing sodium hydroxide could be shipped under UN 2795, *batteries, wet, filled with alkali.* IFALPA believes it is appropriate to similarly distinguish between lithium metal and lithium ion batteries.

4. Because of the significantly different chemical properties, lithium metal and lithium ion batteries react very differently to an external fire source. Through testing at the Federal Aviation Administration's (FAA) Technical Center, the U.S. Department of Transportation (DOT) has shown that a fire involving lithium metal batteries would involve all batteries in a shipment, burn at a temperature above the melting point of aluminum, and be accompanied by a pressure pulse that would possibly cause the failure of a cargo compartment liner in an aircraft. Most importantly, the Halon suppression systems currently in use on commercial aircraft would have no effect on a fire involving lithium metal batteries. In contrast, several tests have shown that fires involving lithium ion batteries are easier to control. The UK CAA published a report ("Dealing With In-Flight Lithium Battery Fires in Portable Electronic Devices" (CAA Paper 2003/4)), where it was shown that battery fires involving single batteries in the cabin of an aircraft could be extinguished effectively with the onboard suppression devices. Additionally, while the report has not yet been published, in July 2006 a representative from the FAA Technical Center stated at the National Transportation Safety Board (NTSB) Hearing for the UPS 1307 accident (In-flight fire and evacuation at Philadelphia in February 2006) that testing involving lithium ion batteries is complete, and that fires involving those batteries could be extinguished with Halon.

5. At the twenty-ninth session, members of the Sub-Committee questioned the necessity of the PRBA proposal, noting that there was no proposed change in the transportation requirements between lithium metal and lithium ion batteries. The Sub-Committee is asked to consider, however, that both individual states and operators have imposed additional restrictions on lithium metal batteries, including prohibiting them from transport (except when contained in or packed with equipment) on passenger aircraft. These additional restrictions do not apply to lithium ion batteries, but because lithium metal and lithium ion batteries share the same UN number, there is often confusion surrounding the transport of these dangerous goods. Distinct UN Numbers would facilitate correct acceptance of these batteries and compliance with regulation. Furthermore, the Sub-Committee has historically taken the view that when substances

elicit different emergency response procedures, different UN numbers should be used (see for example 2.0.2.5(d)). Distinct UN numbers would aid in ensuring appropriate emergency response procedures are taken in the event of an accident involving lithium metal or lithium ion batteries.

6. While IFALPA is not proposing further changes to the regulations beyond distinct UN Numbers at this time, it does anticipate bringing proposals to ICAO for consideration for the air mode. These proposals may include changes in packaging requirements, quantity limitations, or procedures for emergency response for both flight crew and emergency responders. Having distinct UN Numbers and being able to quickly distinguish between lithium metal and lithium ion batteries is an important precursor to many of these proposals. It also is consistent with how UN numbers and proper shipping names are established under the Model Regulations. That is, dangerous goods are assigned UN numbers and proper shipping names "according to their hazard classification and their composition." (See Section 2.0.2.1 of the Regulations.) The composition of lithium metal and lithium ion batteries are significantly different and therefore warrant separate UN numbers and shipping names.

Proposal

7. IFALPA proposes:

.1 that new UN numbers and shipping names for lithium ion batteries be provided in the Dangerous Goods List as follows:

UN XXXX **LITHIUM ION BATTERIES** (including lithium ion polymer batteries)

and

UN YYYY **LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT** or
UN YYYY **LITHIUM ION BATTERIES PACKED WITH EQUIPMENT**.

The column entries in the Chapter 3.2 Dangerous Goods list would be the same as for UN 3090.

.2 that consequential amendments to Special Provision 188 be made as follows:

188 ~~Lithium~~ *Cells* and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

(a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium ion cell, the Watt-hour rating is not more than 20 Wh;

(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium ion battery, the Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;

(c) Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part III, sub section 38.3;

(d) Cells and batteries are separated so as to prevent short circuits and are packed

in strong packagings, except when installed in equipment; and

(e) Except when installed in equipment, each package containing more than 24 li~~thium~~ cells or 12 ~~lithium~~ batteries shall in addition meet the following requirements:

(i) Each package shall be marked indicating that it contains lithium batteries *or lithium ion batteries, as appropriate*, and that special procedures should be followed in the event that the package is damaged;

(ii) Each shipment shall be accompanied with a document indicating that packages contain lithium batteries *or lithium ion batteries, as appropriate*, and that special procedures should be followed in the event a package is damaged;

(iii) Each package is capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

(iv) Except in the case of lithium batteries *or lithium ion batteries* packed with equipment, packages may not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell.

.3 that consequential amendments be made to the introduction to SP 310 as follows:

310 The testing requirements in Chapter 38.3 of the Manual of Tests and Criteria do not apply to production runs consisting of not more than 100 ~~lithium~~ cells and batteries, or to pre-production prototypes of cells and batteries when these prototypes are transported for testing, if:

.4 that consequential amendments be made to packing instruction P903 as follows:

P903	***PACKING INSTRUCTION***	**P903**
This instruction applies to UN Nos. 3090, 3091, XXXX and YYYY.		
The following packagings are authorized, provided the general provisions of 4.1.1 and 4.1.3 are met: Packagings conforming to the packing group II performance level. In addition, batteries employing a strong, impact resistant outer casing of a gross mass of 12 kg or more, and assemblies of such batteries, may be packed in strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates) unpackaged or on pallets. Batteries shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements. When ~~lithium~~ cells and batteries are packed with equipment, they shall be packed in inner fibreboard packagings that meet the requirements for packing group II. When ~~lithium~~ cells and batteries included in Class 9 are contained in equipment, the equipment shall be packed in strong outer packagings in such a manner as to prevent accidental operation during transport.		
Additional requirement: Batteries shall be protected against short circuit		

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Sub-Committee of Experts on the
Transport of Dangerous Goods

Thirtieth session
Geneva, 4-12 (a.m.) December 2006
Item 2(a) of the provisional agenda

PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Model Regulations on the Transport of Dangerous Goods

Transmitted by the expert from the United Kingdom

Background

During the discussions on restructuring of Class 7 at the twenty-ninth session (ST/SG/AC.10/C.3/2006/53) it was agreed that there was a need to amend the general definition of "freight container" in Chapter 1.2 to remove the reference to the International Convention for Safe Containers (CSC). Members of the Sub Committee felt that it was not appropriate to include such a reference within the main text of the definition. However, it remains necessary to make some reference to CSC in the Model Regulations. The United Kingdom undertook to review the text.

Proposal

The expert from the United Kingdom considers that there should be a reference to the CSC in a Note at the end of the definition for freight containers. This placing would assist the reader, in that he/she would expect to find a reference to a relevant standard for an item alongside text describing it. It would also be consistent with other paragraphs in the Model Regulations, where formal standards that can be followed to meet a requirement are cited in an accompanying Note.

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page 2

Amend the Chapter 1.2 definition of "freight container" as follows:

“Freight container means an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or other modes of transport, without intermediate reloading; and designed to be secured and/or readily handled, having fittings for these purposes.

Note: Freight containers should be approved in accordance with the International Convention for Safe Containers (CSC), 1972, as amended” .

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Model Regulations on the Transport of Dangerous Goods

Proposed amendment of lithium ion battery size limit in SP 188

Transmitted by the Portable Rechargeable Battery Association (PRBA)

1. At its twenty-ninth session, the Sub-Committee considered a proposal from PRBA in document ST/SG/AC.10/C.3/2005/44 to increase the exception limit in Special Provision 188 for lithium ion batteries to 200 Watt-hours provided the batteries were shipped at no more than 50% state-of-charge. Based on comments received from members of the Sub-Committee, PRBA has chosen to submit a simplified proposal increasing the exception limit to 150 Wh for road, rail, and sea transport while retaining the existing limit of 100 Wh for air transport.

2. As explained in ST/SG/AC.10/C.3/2005/44, there is an increasing demand for more powerful portable consumer electronic equipment, which prompted PRBA to ask the Sub-Committee to reconsider the existing exception limits for lithium ion batteries. Some equipment manufacturers are already using two batteries in certain equipment in order to avoid having to consign their portable electronic equipment as dangerous goods. Use of two batteries is more costly, is less efficient than having a single battery and is less convenient to the user. Further,

having two batteries directly adjacent to one another in the equipment provides little or no safety benefit over one single larger battery.

3. The alternative of using larger fully regulated batteries in consumer electronic devices is not practical. At present, transporting consumer electronic devices with batteries containing more than 100 Wh (8 grams equivalent lithium content) would require that such equipment be transported under UN 3091 as dangerous goods. The consumer electronics distribution chain is not accustomed to handling dangerous goods and changes needed to accommodate larger batteries as dangerous goods will not be considered cost effective. Furthermore, consumers frequently have occasion to offer portable electronic equipment for transport. Consumers transporting batteries larger than the SP 188 exception limit would be subject to all of the requirements applicable to consignors of dangerous goods (e.g.; training, transport document, packaging, labeling and marking). Thus, the impracticality of using batteries exceeding the SP 188 limit for consumer product purposes is apparent.

4. PRBA understood comments at the 29th session in opposition to the proposed increase to 200 Wh stemmed from concerns regarding air transport. To satisfy these concerns, PRBA proposes to maintain the current limit of 100 Wh (equal to 8 g equivalent lithium content) for purposes of air transport while proposing a more modest increase to 150 Wh for other modes.

5. An increase in the SP 188 exception limit to 150 Wh, for modes other than air, is needed in order to continue to meet the rising power demand in portable consumer electronic equipment, facilitate transport of consumer electronic devices, and promote innovation in notebook computers, cordless power tools, and batteries. The increase will provide distributors, retailers, and consumers with a practical and safe means to transport portable electronic equipment containing larger lithium ion batteries that inevitably will be used in such products.

Proposal

On the basis of the above discussion, PRBA proposes the following amendment to Special Provision 188. This proposal is based on the text adopted by the Sub-Committee at the twenty-ninth session:

"188 Cells and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium ion battery, the Watt-hour rating is not more than ~~100~~ ***150 Wh, except that for air transport, the Watt-hour rating is not more than 100 Wh***. Lithium ion batteries subject to this provision shall be marked with its Watt-hour rating on the outside case;"

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Model Regulations on the Transport of Dangerous Goods

Special provision 188 concerning lithium batteries

Transmitted by the expert from the United States of America

Background

Special Provision 188 provides an exception from the provisions of the UN Model Regulations for lithium cells and batteries provided certain conditions are met. Currently, except when installed in equipment, packages containing more than 24 lithium cells or 12 lithium batteries must also meet the following additional requirements:

(i) Each package shall be marked indicating that it contains lithium batteries and that special procedures should be followed in the event that the package is damaged;

(ii) Each shipment shall be accompanied with a document indicating that packages contain lithium batteries and that special procedures should be followed in the event a package is damaged;

(iii) Each package is capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

(iv) Except in the case of lithium batteries packed with equipment, packages may not exceed 30 kg gross mass.

During the twenty-ninth session, the Sub-Committee was presented information on the electrical hazards posed by lithium batteries (ST/SG/AC.10/C.3/2005/43 and UN/SCETDG/29/INF.42). The potential electrical hazard of a lithium battery meeting the provisions of SP 188 is no less than that of a fully regulated lithium battery. The annex to this document contains a summary of lithium battery incidents the United States is aware of over the last 10 years. Based on this information, the expert from the United States proposes amendments to the provisions of SP 188 to address the risk of these cells and batteries due to their potential to short circuit.

Packaging

Special provision 188 contains provisions intended to ensure the cell or battery's integrity throughout the handling and transport system, and that fire or disassembly does not occur due to internal or external short circuiting. For example, SP 188 (c) requires design type testing according to the Manual of Tests and Criteria, Part III, sub-section 38.3; SP 188 (d) requires cells and batteries, except when installed in equipment, to be separated so as to prevent short circuits and packed in strong outer packagings; and SP 188 (e) (iii) requires a package containing more than 24 cells or 12 batteries to pass a 1.2 m drop test without damage, shifting that allows contact, or release of contents. While these are valid requirements, the fact remains that incidents are occurring with damage that could be attributable to mishandling. Therefore, the expert from the United States proposes to enhance the packaging requirements in SP 188 to improve safety. Adding a requirement to individually package lithium cells or batteries transported under this exception will add additional protection to prevent short circuits.

Batteries installed in equipment

The quantity limits and testing requirements prescribed in SP 188 apply to cells and batteries when installed in equipment and when the cells or batteries are packaged separately. However, the special provision does not contain requirements for the proper preparation of lithium batteries when installed in equipment. Excepted lithium batteries installed in equipment pose an electrical safety hazard due to their potential to short circuit equivalent to that of batteries installed in equipment transported in accordance with Packing Instruction P903. In this paper we are proposing to amend SP 188 to require protection against short circuit and accidental activation of the equipment equivalent to the level of protection required in P903.

Cell or battery quantity

Special provision 188 (e) provides requirements for marking, documentation, a drop test, and gross mass limit applicable only for packages containing more than 24 cells or 12 batteries. The heat and/or fire hazard resulting from an internal or external short circuit of just one cell or battery is sufficient to cause a dangerous condition in transport. Taking into account the

electrical hazard potential, there seems to be no reason to apply the safety requirements in SP 188(e) to only packages containing more than 24 lithium cells or 24 lithium batteries. As such the expert from the United States proposes to apply the requirements in (e)(i)-(e)(iv) regardless of the quantity of cells or batteries in a package.

Marking

Special provision 188(e)(i) contains a marking requirement to indicate the package contains a lithium cell or battery and that special procedures should be followed in the event that the package is damaged. This requirement should be more specific to ensure the necessary handling information is communicated to transport personnel to reduce rough handling that could contribute to the possibility of a transport incident involving lithium batteries. Therefore, it is suggested that the Sub-Committee expand the current marking requirement in SP 188. This amendment is based on a voluntary industry standard found in IEC 62281, *Safety of primary and secondary lithium cells and batteries during transport.* The IEC 62281 provides proper handling instructions, warning statements and safety symbols. The application of the IEC marking provisions is voluntary; therefore they are not applied consistently. This proposal seeks to standardize the marking requirements for transport. These same amendments are proposed for the documentation requirements in SP 188(e)(ii).

Proposal

Amend Special Provision 188 as follows:

188 Lithium cells and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

(a) For a lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for a lithium ion cell, the Watt-hour rating is not more than 20 Wh;

(b) For a lithium metal or lithium alloy battery the aggregate lithium content is not more than 2 g, and for a lithium ion battery, the Watt-hour rating is not more than 100 Wh. Lithium ion batteries subject to this provision shall be marked with the Watt-hour rating on the outside case;

(c) Each cell or battery is of the type proved to meet the requirements of each test in the Manual of Tests and Criteria, Part III, sub section 38.3;

(d) Cells and batteries, except when installed in equipment, shall be packed in inner packagings that completely enclose the cell or battery. Cells and batteries shall be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit. The inner packagings or trays shall be packed in strong outer packagings which are constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use.

(e) Cells and batteries when installed in equipment shall be protected from damage and short circuit, and shall be equipped with an effective means of preventing accidental activation. When lithium batteries are installed in equipment, the equipment shall be packed in strong outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.

(f) Each package shall be marked to indicate that:
(i) the package contains lithium cells or batteries;
(ii) the package shall be handled with care and that a flammability hazard exists if the package is damaged;
(iii) special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
(iv) a telephone number for additional information.

(g) Each shipment shall be accompanied with a document indicating that:
(i) the packages contains lithium cells or batteries;
(ii) the packages shall be handled with care and that a flammability hazard exists if the package is damaged;
(iii) special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and
(iv) a telephone number for additional information.

(h) Except when lithium batteries are installed in equipment, each package shall be capable of withstanding a 1.2 m drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and

(i) Except when lithium batteries are installed in or packed with equipment, packages shall not exceed 30 kg gross mass.

As used above and elsewhere in these Regulations, "lithium content" means the mass of lithium in the anode of a lithium metal or lithium alloy cell.

Annex (ENGLISH ONLY)

Lithium battery and battery-powered devices

Summary of incidents

DATE	TYPE OF BATTERY	**DEVICE** (if applicable)	**INCIDENT SUMMARY**
17-Jul-2006	EaglePicher-Kokam Lithium ion/polymer (used for remote control models), 122 batteries of various sizes		The unlabeled/marked package was discovered to have caught fire while being held in bond for customs clearance in Korea. Package had traveled to Korea in FedEx system from Vienna via Paris and Subic Bay.
15-May-2006	Lithium-ion (VGP-BPL2/VGP-BPS2 or equivalent)	Laptop with spare battery	Shortly before flight departure, a burning smell was detected in the first-class cabin of a Lufthansa ORD-MUC flight. Maintenance personnel were called to check and found it was coming from hand luggage inside an overhead luggage bin above seat 2A. The flight attendants evacuated the passengers in first class and first 2 rows of coach class. Crew used extinguishers to prevent setting off what was seen as the beginning of a slow fire. Maintenance immediately brought the bag outside the aircraft onto the ramp where it started to catch fire. Fire dept was called to assist. Fire was eventually put out after reigniting once. Fire apparently started from the extra battery pack for a laptop (not known if loose or attached to laptop). Flight departed 1 hour 18 minutes late.
03-MAR-2006	Lithium ion button cells, mfr. by Lixing		US-bound package was noticed to be smoking at outbound FedEx station in Shenzen, China. Upon inspection, the package of lithium ion batteries was discovered to be on fire.
29-JUN-2005	Lithium Ion	Battery-pack	At UPS in Ontario, Calif., during unloading of a ULD from Shanghai, it was discovered that a fire had taken place inside the ULD. A package containing a lithium-ion battery pack was identified as the source of the fire. Upon discovery, the burnt package and its contents were cool to the touch and there was no smoldering evident.

DATE	TYPE OF BATTERY	**DEVICE** (if applicable)	**INCIDENT SUMMARY**
11-FEB-2005	Lithium battery, solid cathode, manufactured by Eagle Picher of Surrey, BC, Canada.	None	An undeclared package containing 18 lithium batteries caught fire while being unloaded from a conveyor belt at the FedEx facility in White Bear Lake, MN. FedEx cargo handlers report hearing a "pop" sound and then seeing the box "lifted" off the conveyor belt by the force. The shipment had flown from Los Angeles to Minneapolis and was to be trucked to Clear Lake, WI. Only one battery caught fire
29-Oct-2004	Ultralife 9-volt lithium (traditional 9-volt form: rectangular with two terminals on top)	Small electronic device (details to come)	Shortly after departure, the battery exploded in the hand of a cameraman traveling on the VP campaign plane of Sen. Edwards (the cameraman reportedly was in the process of changing batteries). It spewed shrapnel and ignited a fire in the seat which was extinguished by flight attendants and others. The flight crew declared an emergency and returned to Raleigh-Durham airport without further incident.
07-Aug-2004	Lithium-ion	Lithium-ion batteries assembled together in a plastic case	Prototype lithium batteries shipped under a competent authority approval from California to Europe apparently started a fire in a ULD during the loading process at the FedEx Memphis hub. The ULD had just been loaded for a transatlantic flight (Memphis-Paris). The ULD and many other packages in it were damaged/destroyed by fire. Shipment apparently was in violation of the DOT approval allowing the prototype battery to be shipped.
01-Apr-2004	CR123 lithium batteries	Flashlight	A flight attendant lent a passenger a flashlight which was recently purchased in Beijing. The passenger dropped the flashlight while it was on. Later the passenger put the flashlight in a seatback pocket. A few minutes later, the flashlight began to emit smoke and noxious fumes. The flashlight became so hot it could only be handled with oven mitts.

DATE	TYPE OF BATTERY	**DEVICE** (if applicable)	**INCIDENT SUMMARY**
02-Nov-2003	Ni-Cad, Ni-Methyl Hydride, and/or Lithium (according to label on computer)	Notebook computer – Toshiba Satellite model # 815-S129	At security screening, a passenger's bag contained a computer bearing a warning label on the bottom near the battery compartment: "Warning: Hot base may cause burn. Avoid prolonged contact with bare skin." Battery compartment was hot. Screener had passenger turn off computer.
12-Aug-2002	Lithium battery (excepted)	Samsung mini computer (palm pilot)	Burning odor detected by handlers at the Los Angeles FedEx inbound package sort center. Battery apparently short-circuited causing the bubble wrap in the package to burn and melt onto the unit.
12-Apr-2002	Lithium batteries	None	Lithium batteries shipped under exception by Abbott Labs did not have terminals protected from short circuit. Started fire inside package at FedEx Indy sort facility.
03-Nov-2000	Hawker lithium sulphur dioxide batteries	None	While in route by road to the FedEx Cargo facility in Portland, OR, a lithium battery shorted and ruptured, burning its packaging. The shorted battery had long flexible protruding positive and negative terminals. Two FedEx drivers were treated at a hospital after inhaling fumes from the incident.
28-Apr-1999	Primary Lithium batteries (excepted)	None	After shipment (two pallets/120,000 batteries) transferred from passenger flight to cargo facility at LAX, a fire occurred. Cargo employee possibly mishandled one of the two pallets. One pallet caught on fire, was moved, the second pallet then caught fire. Initial attempts to extinguish the blaze using water/chemical fire extinguishers failed.
26-Sep-1996	Lithium batteries	None	Eight lithium batteries were connected in a series and packed with bubble wrap inside a plastic express envelope. There were exposed connections on one end and loose wires on the other end. The batteries were not secured from movement within the package and a short-circuit resulted causing the packaging to burn. Burnt package discovered at Airborne sort center after first flight and prior to trans-Pacific cargo flight.

DATE	TYPE OF BATTERY	**DEVICE** (if applicable)	**INCIDENT SUMMARY**
08-May-1994	Duracell lithium batteries (excepted from ICAO regulation by SP A45)	None	Consignment of lithium batteries found emitting smoke in ULD during truck transport to LHR. Fire damage. Batteries were smaller in diameter than a dime and about 5 mm high. They had been tossed loosely into a box. Positive and negative terminals had "tails" which were prone to short circuiting. The shipper was prosecuted by the UK CAA for failure to comply with Special Provision A45 of the ICAO Technical Instructions and fined £1200 with £300 costs.

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Model Regulations on the Transport of Dangerous Goods

General Provisions
1.1.5: Exceptions for dangerous goods packed in limited quantities

Transmitted by the Universal Postal Union (UPU)

SUMMARY

Executive Summary: The current regulation for the acceptance of infectious substances for transport by mail does not specify the appropriate UN Categories permissible for carriage under the Acts of the Universal Postal Union (UPU).

The Acts of the UPU only permit the carriage of limited quantities of Category B Infectious Substances (UN 3373) in the international mail stream. The requested change below will conform to the Acts of the UPU by restricting the carriage of Category A Infectious Substances (UN2814 and UN2900) in the international mail stream.

Additionally, the Acts of the Universal Postal Union only apply to the international carriage of items by post. For domestic movement, the regulations set forth by the respective national postal authority or the competent authority apply.

Note: This proposal is subject to confirmation by the next Plenary session of the UPU Council of Administration on 19 October 2006.

Action to be taken: Change the text to annotate this restriction.

Related documents: None.

1.1.1.5 ***Exceptions for dangerous goods packed in limited quantities***

Certain dangerous goods packed in limited quantities are exempted from certain requirements of these regulations subject to the conditions laid down in Chapter 3.4.

1.1.1.6 In accordance with the Universal Postal Union Convention, dangerous goods as defined in these Regulations, with the exception of those listed below, are not permitted in ~~the~~ mail transported internationally. National postal authorities or the competent authority should ensure that provisions are complied with in relation to the international transport of dangerous goods. The following dangerous goods may be acceptable in international mail subject to the provisions of the national postal authorities, or under the approval the respective competent authority:

(a) Infectious substances assigned to Category B (UN3373) only, and solid carbon dioxide (dry ice) when used as a refrigerant for ~~infectious substances~~ UN3373; and

(b) Radioactive material in an excepted package conforming to the requirements of 2.7.9.1, the activity of which does not exceed one tenth of that listed in Table 2.7.7.1.2.1.

For international movement by post additional requirements for quantity restrictions, packaging and labelling as prescribed by the Acts of the Universal Postal Union apply.

The Acts of the Universal Postal Union do not apply to the domestic transport of dangerous goods. Domestic transport of dangerous goods in the mail are subject to the provisions of the national postal authority.

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PROPOSALS OF AMENDMENTS TO THE RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

Excepted quantities

Note by the secretariat

Assignment of excepted quantity codes for substances of Division 5.2

1. At its last session, the Sub-Committee adopted codes for excepted quantities on the basis of ST/SG/AC.10/C.3/2006/45 (United Kingdom). It was agreed to add alphanumeric codes to column 7 of the Dangerous Goods List (see ST/SG/AC.10/C.3/2006/101).

2. For Division 5.2 the code E2 has been indicated with a footnote reading: "Division 5.2 dangerous goods may ONLY be transported as excepted quantities if in UN No. 3316, Chemical Kit or First Aid Kit;".

3. However, the table where this footnote appears is not to be reproduced in the Model Regulations. Therefore the secretariat suggests that the indication "NONE" should be entered in column 7 for all Division 5.2 entries, and that the following special provision be assigned to all these entries:

"SPXXX Organic peroxides may be transported as excepted quantities when transported under UN No. 3316, Chemical kit or First aid kit.".

Assignment of Excepted quantity codes for substances of Class 2

4. For Division 2.2, the code E2 has been indicated with a footnote reading: "For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer package;".

5. The information given in this footnote may be useful for the users of Excepted quantities regime. Therefore, the secretariat suggests that this should be reproduced as a new paragraph in 3.5.1.2, after the table.

Assignment of excepted quantity codes for substances without packing groups

6. Some dangerous goods for which packing groups are not assigned have not been addressed. It seems that they should be assigned the mention "NONE":

UN No.		**Class / Division**	**LQ**
1327	HAY, STRAW or BHUSA	4.1	3 kg
3360	FIBRES, VEGETABLE, DRY	4.1	NONE
1856	RAGS, OILY	4.2	NONE
2426	AMMONIUM NITRATE, LIQUID (hot concentrated solution)	5.1	NONE
2794	BATTERIES, WET, FILLED WITH ACID, electric storage	8	1 L
2795	BATTERIES, WET, FILLED WITH ALKALI, electric storage	8	1 L
2800	BATTERIES, WET, NON-SPILLABLE, electric storage	8	1 L
3028	BATTERIES, DRY, CONTAINING POTASSIUM HYDROXIDE SOLID, electric storage	8	2 kg
2990	LIFE-SAVING APPLIANCES, SELF-INFLATING	9	NONE
3072	LIFE-SAVING APPLIANCES NOT SELF-INFLATING containing dangerous goods as equipment	9	NONE
3166	ENGINE, INTERNAL COMBUSTION or VEHICLE, FLAMMABLE GAS POWERED or VEHICLE, FLAMMABLE LIQUID POWERED	9	NONE
3171	BATTERY-POWERED VEHICLE or BATTERY-POWERED EQUIPMENT	9	NONE
3245	GENETICALLY MODIFIED MICROORGANISMS or GENETICALLY MODIFIED ORGANISMS	9	NONE
3316	CHEMICAL KIT or FIRST AID KIT	9	NONE
3334	AVIATION REGULATED LIQUID, N.O.S.	9	NONE
3335	AVIATION REGULATED SOLID, N.O.S.	9	NONE
3359	FUMIGATED UNIT	9	NONE
3363	DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN APPARATUS	9	NONE

7. Should the Sub-Committee decide to assign "NONE" to UN 3316, the secretariat proposes to add the following sentence at the end of special provision 251 in Chapter 3.3: "Chemical kits and first aid kits containing dangerous goods in inner packagings which do not exceed the quantity limits for excepted quantities applicable to individual

substances as specified by means of an alphanumeric codes in column 7 (bottom of the cell) of the Dangerous Goods List may be transported in accordance with Chapter 3.5.".

Column 7: Heading and explanatory text

8. For the assignment of Excepted quantity codes in column 7 of the Dangerous Goods List, the principle adopted by the Sub-Committee according to the proposal in ST/SG/AC.10/C.3/2006/45 is to split the cells in column 7 into 2 parts separated by an horizontal line.

9. The Dangerous Goods List is actually presented as an Excel document. Excel format allows a wide range of keyword searching possibilities. However, this format does not permit to split existing cells easily while keeping the possibility to use the data filter function properly.

10. Therefore, the Secretariat proposes, as an alternative, to place the Limited Quantity values in the top of the cells and the Excepted quantity codes in the bottom of the cells in column 7, without horizontal line between these two codes.

11. Proposal:

In the amendments adopted by the Sub-Committee at its 27th, 28th and 29th sessions (Document ST/SG/AC.10/C.3/2001/101), modify the amendments to Chapter 3.2 as follows:

3.2.1 In the new explanatory text for column 7:

In the first sentence, replace "above the horizontal line" by "at the top of the cells".
In the second sentence, replace "Below the horizontal line" by "At the bottom of the cells".
In the last sentence, replace "above or below the horizontal line" by "at the top or at the bottom of a cell".

In the amendments to the Dangerous Goods List, delete the horizontal line in the new heading for column 7 and delete ", add a horizontal line in each cell and insert" after "In column (7)".

Assignment of a code for goods not permitted to be transported as excepted quantities

12. It is furthermore proposed to use a code "E0" instead of "None" for the goods not permitted to be transported as excepted quantities.

References to column 7 of the Dangerous Goods List

13. Different paragraphs of the UN Model Regulations refer to limited quantities indicated in column 7 of the Dangerous Goods List. The assignment of Excepted quantity codes in column 7 will make it necessary to amend the existing references to column 7.

14. Proposals:

Amend the following paragraphs as follows:

3.3.1 SP236 Replace the last sentence ("The quantity limit shown in Column 7 of the Dangerous Goods List applies to the base material.") by the following: "The quantity limit and the excepted quantity code shown in column 7 of the Dangerous Goods List apply to the base material.".

SP251 In the first paragraph, replace "in column 7" by "in column 7 (top of the cell)".
In the last paragraph, insert "for limited quantities" after "quantity limits".

SP301 In the fourth and the last sentences, replace "in column 7" by "in column 7 (top of the cell)".

3.4.1 In the second and the third sentences, replace "in column 7" by "in column 7 (top of the cell)".

5.4.1.5.2 Replace "in column 7" by "in column 7 (top of the cell)".

3.5.1.2, heading of the columns in the table

15. The secretariat suggests that the heading of the second and third columns should be amended to read "Maximum quantity per inner packaging" and "Maximum quantity per outer packaging" respectively.

Marking of packages (3.5.1.5)

16. The secretariat would like to remind the Sub-Committee that one of its basic terms of reference, embodied in ECOSOC resolution 468G (XV) of 15 April 1953, is "Recommending marks or labels for each grouping or classification which shall identify the risk graphically and without regard to printed text". In international transport, a text printed on a package in a given language is not necessarily understood everywhere in the world. Therefore the secretariat suggests that the words "DANGEROUS GOODS IN EXCEPTED QUANTITIES" be replaced by the acronym "EQ".

17. The words "Class & Division Number(s)" should not appear on the mark itself and should be replaced by an asterisk with a corresponding footnote "*/ location of class and division numbers" or "*/ Place for class and division numbers".

18. The meaning of "Class & Division Number(s)" should be clarified. For example, for gases of Division 2.2, it is not clear whether the indication should be "2, 2.2", "2" or "2.2". In this respect, it should be recalled that the word "division" is not used in the IMDG Code except for the Classes 1 and 2 divisions, and that it is used in ADR, RID and ADN only for Class 1 divisions.

19. For the identification of the name of the consignor or consignee, this should be done on the model of the mark through asterisks (see para. 17 above).

20. The secretariat would like to recall that the words "consignor" and "consignee" may be interpreted differently depending on the legal context of the contract of transport, and this could be a problem for multimodal international operations. For example, under ADR, when there is a contract of carriage, the consignors and consignees are the consignors and consignees according to the contract of carriage and are not necessarily the original consignor and the final consignee, since they could be freight forwarders. Usually, the name of the original consignor and final consignee are marked on the package, but since the consignor and the consignee could be different on a specific leg of a multimodal transport operation, the requirement to indicate the name of the consignor or consignee on this mark could lead to problems.

3.5.1.6

21. The term "transport unit" is not defined in the Model Regulations, except in 5.3.1.1.1 where it is defined "for the purposes" of Chapter 5.3. It is not clear how this provision would be interpreted for air transport.

22. The secretariat suggests that the "transport units" concerned be specifically named in this paragraph if they differ from those listed in 5.3.1.1.1, or, if they are the same, that a definition be included in 1.2.1. It is recalled that the word "cargo transport unit" is used in the IMDG Code, and that a transport unit under ADR means a motor vehicle without an attached trailer or a combination of a motor vehicle with an attached trailer.

3.5.1.7

23. This paragraph is likely to raise problems of interpretation. It should make clear whether a transport document according to Chapter 5.4 is requested or not, and if such a document is not requested, whether the information is required when electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques are used instead of paper documentation.

Cross-references to paragraphs related to Class 7

24. As a consequence to the draft amendments concerning radioactive material adopted by the Sub-Committee at its last session (see ST/SG/AC.10/C.3/58/Add.2), the secretariat proposes to replace "*2.7.7.1.2.1 and 2.7.9.1*" by "*1.5.1.5*" in the note in 3.5.1.1.

— END —