TWENTY-SECOND MEETING OF THE DANGEROUS GOODS PANEL (DGP) (2009)

LETTER OF TRANSMITTAL

To: President, Air Navigation Commission

From: Chairman, Dangerous Goods Panel (DGP) (2009)

I have the honour to submit the report of the twenty-second meeting of the Dangerous Goods Panel (DGP) which was held in Montréal, from 5 to 16 October 2009

Geoff Leach
Chairman

Montréal, 16 October 2009

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LIST OF RECOMMENDATIONS*

* Recommendations annotated "RSPP" relate to proposals for amendment of Standards, Recommended Practices and Procedures for Air Navigation Services or guidance material in an Annex.

DANGEROUS GOODS PANEL (DGP)

TWENTY-SECOND MEETING

Montréal, 5 to 16 October 2009

HISTORY OF THE MEETING

1. DURATION

1.1 The twenty-second meeting of the Dangerous Goods Panel (DGP/22) was opened by Mr. Omari Nundu, President of the Air Navigation Commission (ANC) in Montréal, at 1000 hours on 5 October 2009. The meeting ended on 16 October 2009.

2. ATTENDANCE

2.1 The meeting was attended by members nominated by sixteen Contracting States and two international organizations as well as by advisers and observers as shown in the list below:

Members	Advisers	Nominated By
A. Tusek	L. Willoughby	Australia
K. Vermeersch		Belgium
M. Paquette	D. Evans T. Howard E. Servant D. Sylvestre	Canada
J. Rui	J. Abouchaar S. Aidong A. Chung J. Hong X .Sun P. Tse Z. Ying Q. Zhenghua	China (Hong Kong)
J. Le Tonqueze	M. Plassart P. Tatin	France

Members	Advisers	Nominated By
H. Brockhaus	G. Closhen P. Blümel J. P. Friebe P. Lamp L.C. Michels C. Weber U. Wienecke	Germany
	C. Carboni G. Criniti	Italy
M. Matsui	A. Cho M. Horie K. Moriwaki I. Uehara K. Yanagawa	Japan
D. Raadgers	M. Alink W. Hoogerhout T. Muller H. Van der Maat	Netherlands
M. Evans		New Zealand
S. W. Park		Republic of Korea
D. Mirko	D. V. Kourdchenko	Russian Federation
L. C. Bárcena		Spain
H. Al Muhairi	P. Balasubramanian P. King A. Wagih	United Arab Emirates
G. Leach	R. McLachlan S. Pinnock	United Kingdom
D. Pfund	L. Gianfrate K. Leary J. McLaughlin	United States

Members	Advisers	Nominated By
D. Brennan	J. Bernardi M. Molina Toledo P. Oppenheimer B. Sullivan J. Webster	IATA
M. Rogers	J.A. Haynes	IFALPA
Advisers		
E. Sigrist		CEFIC
	A. Altemos B. Barrett R. Jessop N. McCulloch F .Wybenga	DGAC
Observers		
Z. Welserheimb		Austria
J. Dridi H. Jameleddine		Tunisia
R. Joss D. Ruhier		Switzerland
P. Van den Eyndan		ACI
A. McCulloch		GEA
F. Uemo		JEMA
F. Bognar M. Nuyens		NATO
C. Updyke		NEMA

Observers

G.A. Kerchner J. Nishimura	PRBA
R. Wichert	USFCC
B. Bonnardel-Azzarelli	WNTI

3. OFFICERS AND SECRETARIAT

3.1 Mr. Geoff Leach (United Kingdom) was elected Chairman of the meeting and Ms. D. Raadgers was elected Vice-Chairman.

3.2 The Secretary of the meeting was Dr. Katherine Rooney, Technical Officer of the Flight Safety Section, who was assisted by Ms. L. McGuigan, Dangerous Goods Information Officer of the same section.

3.3 Interpretation and translation were provided in English, French, Russian and Spanish.

4. AGENDA OF THE MEETING

4.1 The agenda for the meeting shown hereunder was approved by the Air Navigation Commission on 5 March 2009.

Agenda Item 1: Development of proposals, if necessary, for amendments to Annex 18 — *The Safe Transport of Dangerous Goods by Air*

Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2011-2012 Edition

Agenda Item 3: Development of recommendations for amendments to the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2011-2012 Edition

Agenda Item 4: Amendments to the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481) for incorporation in the 2011-2012 Edition

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

5.1: Approvals

5.2: Exemptions

5.3: Review of provisions for dangerous goods relating to batteries:

a) lithium batteries
b) battery-powered devices
c) battery-powered mobility aids

5.4: Reformatting of the packing instructions

5.5: Carriage of dangerous goods on helicopters

Agenda Item 6: Other business

5. WORKING ARRANGEMENTS

5.1 The panel met as a single body, with ad hoc drafting groups as required. Discussions in the main meeting were conducted in English, French, Russian and Spanish. Some working papers were presented in English only. The report was issued in English, French, Russian and Spanish.

6. OPENING REMARKS BY THE PRESIDENT OF THE AIR NAVIGATION COMMISSION

Good morning ladies and gentlemen.

This is the twenty-second meeting of the Dangerous Good Panel.

On behalf of the Air Navigation Commission, it is my pleasure to welcome you again to Montréal and to ICAO Headquarters.

Subsequent to the twenty-first meeting of the panel held in November 2007, the Commission considered your report and recommended to the Council the acceptance of all your recommendations. The Council approved the amendments for the 2009-2010 Edition of the Technical Instructions, applicable from 1 January 2009, as well as two Addenda, related to classification of mixtures of dangerous goods, provisions requiring State of the Operator approval for mixtures containing ethyl chloride or similar gases and classification criteria for Division 1.4S explosives. In addition, the Council, recognizing the need for a fast track mechanism for urgent safety based amendments to the Technical Instructions, approved such a mechanism.

Since the twenty-first meeting, there have been a number of changes in membership. Messrs. Branscombe, Guerreiro Lima, Mikhin, Serrano, Timmins and Yoshizawa have left the panel, and the Commission is grateful for the contribution they made. In their places, you have been joined by Mr. Tusek nominated by Australia, Mr. Pacheco nominated by Brazil, Ms. Paquette nominated by Canada, Mr. Matsui nominated by Japan, Ms. Bárcena nominated by Spain and Mr. Vasilyevich nominated by the Russian Federation. Following the untimely death of Mr. Osama Al Ameri, the United Arab Emirates has nominated Mr. Al Muhairi as his replacement. In addition, you have a new member, Mr. Park, nominated by the Republic of Korea. The panel now comprises of nineteen members nominated by seventeen States and two international organizations.

During the next days you will be meeting in a panel framework. I would like, as usual, to remind each member that you are here in a personal expert capacity representing your own professional views, which may not necessarily be the same as those of your Administration or Organization. Although you have been nominated by your Government or Organization, you have been accepted by the Air Navigation Commission as an expert in the field of dangerous goods, and, therefore, you are expected to express your own professional opinions. Moreover, the success of any ICAO panel meeting is determined by the ability of the participants to settle the technical issues in a cooperative manner and, although consensus is not an absolute requirement, it is, without any doubt, a warranty of success.

Your first task is to develop proposals for any necessary amendments to Annex 18. Many national aviation administrations feel strongly that the Annexes to the Convention should be stable documents. Accordingly, the ICAO Council has directed that, with the exception of overriding issues such as safety or efficiency, there should be a minimum three-year cycle between Annex amendments.

The second task of this meeting is to recommend necessary revisions to the Technical Instructions for incorporation into the 2011-2012 Edition. Please, remember the word “necessary” and I ask you all to bear in mind that every change imposes some burden on those who have to use this document. Having said that, I realize that the vast majority of amendments arise from aligning the Technical Instructions with the United Nations Recommendations which, in the interests of multimodal harmonization, is essential. The outcome of your discussions on ways to strengthen the harmonized approach between the Technical Instructions and the other modal regulations will be viewed with interest because of the potential benefit to all involved in dangerous goods transport.

The final agenda item concerns the various non-recurrent tasks which have been identified by the Commission and by the panel. I look forward to hearing the outcome of your discussions, especially on approvals and exemptions and also that on lithium batteries.

The Air Navigation Commission and the Council have, with Annex 18 and the Technical Instructions, set the broad structure for ensuring that dangerous goods are transported safely. To collect and organize the myriad details of the Technical Instructions is your task; this requires that you ensure that they are accurate, complete, understandable and practical. The Commission is confident that you will maintain the high standards you have shown in your previous meetings. If you should require any advice or assistance in your work, I trust your chairman will not hesitate to call upon the Secretariat, myself, or any member of the Commission. In any case, we will meet again towards the end of your meeting for an informal debriefing on your achievements. I understand that should take place in the afternoon of the last Thursday and the Commissioners and I look forward to listening to your chairman on that occasion.

It remains for me to declare open, then, the twenty-second Meeting of the Dangerous Goods Panel, to wish you every success in your work and to express my hope that you will enjoy a pleasant stay in Montréal.

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Agenda Item 1: Development of proposals, if necessary, for amendments to Annex 18 — *The Safe Transport of Dangerous Goods by Air*

1.1 DEFINITION OF "STATE OF ORIGIN" (DGP/22-WP/18)

1.1.1 A proposal to revise the definition of "State of Origin" was made. The basis for the proposed revision related to the word "cargo" as it appears in the definition and whether or not the use of this was appropriate since the definition of cargo excludes stores. It was also noted that approvals are for the transport of dangerous goods, but cargo includes both dangerous and non-dangerous goods. It was suggested that "consignment" would be a more appropriate term as it would only apply to dangerous goods and is specific on the timing or duration of the shipment. It was agreed "consignment" clarified the definition.

1.1.2 The meeting agreed to the proposed amendment without further change. The amendment is shown in the appendix to the report on this agenda item.

1.2 AMENDMENTS TO DEFINITIONS PERTAINING TO DANGEROUS GOODS (DGP/22-WP/43)

1.2.1 A proposal to amend the definitions of dangerous goods accident and dangerous goods incident was discussed. It was noted that although the definition of dangerous goods included articles or substances which are capable of posing a risk to the environment, no such reference is made in the other definitions. It was suggested these definitions should be aligned by adding "risk to the environment" to each of these definitions.

1.2.2 Although there was general support for the proposal, it was felt that the term "risk to the environment" would not be sufficient to meet the requirement of what an accident entails and that the definition for dangerous goods incident already addressed environmental risk. It was suggested using the word "damage" in place of "risk" would be more appropriate. Once it was noted that the Model Regulations differentiated between damage to property and damage to the environment, it was agreed that similar differentiation could be made to the definitions in Annex 18. The word "major" as a modifier to environmental damage in the definition of dangerous goods accident would differentiate between the level of damage in an accident as opposed to an incident.

1.2.3 The amendment, as modified, was agreed and is presented in the appendix to the report on this agenda item. Similar amendments to the definitions in the Technical Instructions were agreed (see paragraph 2.2.3) and are presented in the appendix to the Report on Agenda Item 2.

1.3 RECOMMENDATION

1.3.1 In light of the foregoing discussions, the meeting developed the following recommendation:

RSPP **Recommendation 1/1 — Amendment to definitions in Annex 18**

That the definitions for State of Origin, dangerous goods accident and dangerous goods incident in Annex 18 be amended as indicated in the appendix to the report on this agenda item.

1.4 GUIDANCE ON THE REMOVAL OF STATE OF OVERFLIGHT FROM THE EXEMPTION PROCESS (DGP/22-WP/86)

1.4.1.1 At DGP-WG09, the feasibility of requiring that the State of Overflight be a party to issue an exemption was discussed. It was argued that the use of flexible aircraft routings made it virtually impossible to predict which States a flight may overfly. A proposal to delete the requirement in Annex 18, paragraph 2.1 was therefore proposed. A majority of members supported the principle, recognizing the practical problems which existed. It was questioned, however, whether the issue was within the purview of the DGP; accordingly, advice from the Legal Bureau was sought.

1.4.1.2 Written guidance was provided from the Legal Bureau in DGP/22-WP/86, and an officer from the Legal Bureau (LO/LEB) was present at the meeting to provide further guidance. He raised concern with whether the intent of removing the provision was to avoid the jurisdiction of the State of Overflight. It was clarified that the panel never considered this issue as a means of avoiding sovereign rights and jurisdiction. It was explained that an exemption does not imply straying from the regulations; it provides an alternate means of compliance when faced with circumstances which have not been addressed in the Instructions. Even if the requirements were removed from the State of Overflight, a State would retain its sovereignty.

1.4.1.3 One panel member queried whether a notification of an exemption by the operator to the State of Overflight, which might contain a provision for that State to reject the exemption within a certain time period, would satisfy the requirement. In principle, LO/LEB did not see major obstacles in developing this idea but he would need more details before confirming. Another suggestion was a pre-notification with a general statement by the States concerned confirming whether or not they would allow the exemption. LO/LEB felt that this was a bit more vague. Concern was expressed by some panel members over the concept of assuming approval if no response is received from a pre-notification; a diversion to a State which had not approved an exemption could put a flight crew in jeopardy.

1.4.1.4 It was agreed a small working group would develop text taking into account the guidance received in coordination with the Legal Bureau during the next biennium.

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APPENDIX

PROPOSED AMENDMENTS TO ANNEX 18

ANNEX 18

THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

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CHAPTER 1. DEFINITIONS

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Dangerous goods accident. An occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property or environmental damage.

Dangerous goods incident. An occurrence, other than a dangerous goods accident, associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, which results in injury to a person, property or environmental damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardizes the aircraft or its occupants is also deemed to constitute a dangerous goods incident.

. . .

State of Origin. The State in the territory of which the ~~cargo~~ consignment was first loaded on an aircraft.

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Editorial Note.— Additional proposed amendments to Annex 1, which relate to approvals and exemptions, are shown in Appendix E to the report on Agenda Item 5.

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Agenda Item 2: Development of recommendations for amendments to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2011-2012 Edition

2.1 APPROVAL OF WORKING GROUP REPORTS (DGP/22-WP/2 AND WP/3)

2.1.1 The meeting reviewed the narrative parts of the reports of the meetings of the Working Groups of the Whole, DGP-WG08 (The Hague, 3 to 7 November 2008) and DGP-WG09 (Auckland, 4 to 8 May 2009). The narratives were approved without comment. It affirmed the proposals for amendments of the Technical Instructions at those meetings, subject to any subsequent changes made at this meeting.

2.2 AMENDMENTS TO PART 1 OF THE TECHNICAL INSTRUCTIONS : GENERAL

2.2.1 Draft amendments of the Technical Instructions to align to the UN Recommendations — Part 1 (DGP/22-WP/4)

2.2.1.1 The meeting reviewed amendments to Part 1 of the Technical Instructions to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals (for the sake of brevity, subsequently referred to in the report as "the UN Committee") at its fourth session (Geneva, 12 December 2008).

2.2.1.2 It was suggested the new definition for cargo transport unit should only refer to multimodal freight containers and portable tanks since the other units listed in the definition are not used for air transport. This was agreed.

2.2.1.3 There was much discussion on the amendments proposed to Chapter 4, Training. One member pointed out an inconsistency between paragraph 4.2.1 which states that personnel may perform functions for which required training has not yet been provided under the direct supervision of a trained person, and 4.2.2 which states that personnel must be trained. It was noted that training for aviation personnel had always been mandatory and that adding "under direct supervision of a supervisor" could have a detrimental affect on the level of safety provided in the air mode. It was agreed the new text in 4.2.1 would not be adopted. Another member queried the benefit of having a reference to security training in paragraph 4.2.1, since Chapter 5 is devoted to dangerous goods security. It was agreed that this sentence would not be adopted.

2.2.1.3.1 With respect to paragraph 4.2.2, there was much discussion on whether or not the phrase "such training must be verified upon employment prior to performing any covered function" was required. Many members objected to the removal of "upon employment" since without it allowances for people moving from one company to another but performing the same job function could not be made. There were suggestions for improving the clarity of the requirement. New wording was developed and adopted by the panel.

2.2.1.4 Attention was drawn to Chapter 6, General Provisions Concerning Class 7 and the reference to 5;3.2.11 b) under 1;6.1.5.1 a). Paragraph 5;3.2.11 b) requires the application of orientation labels when required by the provisions of 4;1.1.13. However, the provisions of 4;1.1.13 are applicable to all classes *except* Class 7. Accordingly, the reference to 5;3.2.11 b) was deleted. It was also agreed that references to 7;2.5 and 7;4.4 should be added to ensure that excepted packages are also subject to loading restrictions if the packages are damaged and to dangerous goods incident and accident reporting requirements.

2.2.1.5 It was suggested that the term "workers" in 1;6.2.7 should be replaced with "personnel" as this is the term used throughout the Instructions. This was agreed.

2.2.2 Definition of "Net Explosive Mass" (DGP/22-WP/12)

2.2.2.1 A definition for "net explosive mass" was adopted at DGP-WG09. Since a definition for net explosive mass does not exist in the UN Model Regulations, a paper was submitted to the 35th meeting of the UN Sub-Committee proposing that this definition be also adopted into the Model Regulations. After some small modifications and editorial amendments, the definition was adopted for inclusion in Chapter 1.2.1 of the Model Regulations. The panel agreed that the definition, as modified by the UN Committee, be included in the Technical Instructions.

2.2.3 Amendments to Definitions Pertaining to Dangerous Goods (DGP/22-WP/43)

2.2.3.1 A proposal to amend the definitions of dangerous goods accident, dangerous goods incident and dangerous goods security was discussed. Because definitions for dangerous goods accident and dangerous goods incident originate in Annex 18, discussions on these terms were held and reported under Agenda Item 1 (see paragraph 1.2). It was agreed that the text adopted for Annex 18 would also be adopted for the Instructions. The revised definitions are included in the appendix to the report on this agenda item.

2.2.3.2 With regard to dangerous goods security, it was agreed that any proposal for amendment would need to be made to the UN Sub-Committee. A member agreed to submit a proposal at the next meeting of the Sub-Committee.

2.2.4 Training of Dangerous Goods Inspectors (DGP/22-WP/71)

2.2.4.1 A proposal to add requirements for the training of dangerous goods State inspectors to Part 1;4 was discussed. Although there was overall support for a base level to be established for dangerous goods inspectors, it was suggested that placing such a requirement in the Instructions might not be appropriate. Some members suggested more general requirements could be developed for inclusion in the Supplement; others suggested Annex 18 would be a more appropriate place. It was noted that other types of inspectors were in fact defined in other Annexes and that consideration could be given to defining dangerous goods inspectors for inclusion in Annex 18. It was agreed that much more needed to be considered before adopting such provisions. The paper was withdrawn.

2.2.5 **Application Of The Term "Cargo" (DGP/22-WP/98)**

2.2.5.1 A proposal to clarify the term "cargo" within Part 7 of the Technical Instructions to identify that it included "mail" and "stores" was discussed. The amendment was agreed, subject to some modifications to further clarify the proposal.

2.3 AMENDMENTS TO PART 2 OF THE TECHNICAL INSTRUCTIONS : CLASSIFICATION OF DANGEROUS GOODS

2.3.1 **Draft amendments of the Technical Instructions to align to the UN Recommendations — Part 2 (DGP/22-WP/5)**

2.3.1.1 The meeting reviewed amendments to the Part 2 of the Technical Instructions to reflect the decisions taken by the UN Committee.

2.3.1.2 It was queried whether the addition of "including environmentally hazardous substances" in the title of Class 9 in the introductory chapter was necessary, since many other substances were included in Class 9 but not mentioned here. It was agreed that the text should be maintained as it aligned with the Model Regulations.

2.3.1.3 It was suggested by one member that the requirement in new paragraph 3.6 of the introductory chapter was already addressed in paragraph 3.5 and therefore should be deleted. Opposing views expressed that the text in paragraph 3.6 was appropriate as it clarified steps to be taken should 3.5 not apply. It was agreed that the text should be maintained, although some changes were made to both paragraphs in order to enhance their clarity. It was also suggested that the term "dangerous substances" should be replaced with "dangerous goods" but that this could be raised at the UN.

2.3.1.4 The justification for the removal of text in 2;7.2.4.1.1.5 was queried, acknowledging that its removal aligns with the Model Regulations. The Secretary agreed to research the issue and would contact the IAEA for information.

2.3.1.5 It was suggested that a requirement to transport genetically modified live animals under terms and conditions of the appropriate authorities of the States of Origin and Destination appears in the Model Regulations but not in the Instructions. It was agreed that this text should be added to 2;9.2.1 c).

2.3.1.6 A number of suggested editorial amendments to Part 2 were agreed.

2.3.2 **Environmentally hazardous substances (DGP/22-WP/17)**

2.3.2.1 A proposal to remove the requirement for the pressure differential test when transporting **Environmentally hazardous substance, liquid, n.o.s.***, UN 3082 and **Environmentally hazardous substance, solid, n.o.s.***, UN 3077 was discussed. The meeting was reminded that substances assigned to UN 3082 are classified as dangerous goods solely because of their risk to the environment (i.e. they are not capable of posing a risk to health, safety or property when transported by air); the only time they may become involved in an incident which requires appropriate response is on the ground. They do not meet

the criteria for classification as any other class or division of dangerous goods. It was argued that the pressure differential test is not required by the surface modes for UN 3082 and consequently, if the Technical Instructions are not to align, the resulting multimodal disharmony would mean a significant financial burden on industry, as packagings which have been used safely on the ground (and in many cases in air transport) for many years will be subject to testing. Views were expressed that any leak on an aircraft is undesirable. It was argued that while this may be true, many non-dangerous liquids are shipped (without quantity limitations per package) without having to undergo testing of any kind; it was pointed out that combination packagings of UN 3082 would still be required to meet a drop test and stack test, and single packagings (for all modes of transport) are subject to the leakproofness test and the internal pressure (hydraulic) test. It was agreed that the proposal addressed a practical problem and that environmentally hazardous materials did not pose any additional physical risk. The proposal was accepted.

2.3.3 Mixtures or solutions and compatibility (DGP/22-WP/25)

2.3.3.1 The meeting was reminded of the addendum to the current edition of the Instructions, prompted by the explosion of a gas cylinder containing a mixture of ethyl chloride, which clarified the classification of mixtures and the effect the presence of traces may have. It was suggested that although the text provided conditions under which traces could be discounted for classification purposes, no mention was made of the need to still consider any compatibility issues there may be with the trace substance. A note under 2;3.5 and 3;1.3 emphasizing the need for consideration of compatibility was proposed to address this issue.

2.3.3.2 There was support for the proposal in principle, although it was felt the note was too specific in addressing solely traces of substances when in fact it was the whole mixture which must be considered. It was further suggested that perhaps the issue should be addressed in the compatibility section. Concern was also expressed that clarifying requirements by means of notes was not prudent in that it could cause problems with understanding and training when most other requirements did not have similar clarifying notes. Alternative wording to address these concerns was agreed.

2.3.4 Classification for the Flammability Hazard of Ethyl Bromide (DGP/22-WP/44)

2.3.4.1 A proposal to change the primary hazard of **Ethyl bromide** from toxic to flammable was withdrawn on the basis it would first need to be considered by the UN Sub-Committee.

2.4 AMENDMENTS TO PART 3 OF THE TECHNICAL INSTRUCTIONS: DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

2.4.1 Draft amendments of the Technical Instructions to align to the UN Recommendations — Part 3 (DGP/22-WP/6)

2.4.1.1 The meeting reviewed amendments to the Part 3 of the Technical Instructions to reflect the decisions taken by the UN Committee.

2.4.1.2 It was queried why text which exists in the UN Model Regulations does not appear in Special Provision A97. It was noted that the text in A97 had been agreed by DGP-WG08. It was agreed that should any member believe the text should be reinstated a proposal be submitted to the panel later in the meeting. No proposals were submitted.

2.4.1.3 It was clarified that A158 was not included with the amendments to the special provisions as it had been incorporated in the 2009-2010 edition of the Instructions through Addendum No. 2/Corrigendum No. 1.

2.4.1.4 It was agreed that new Special Provision A168 did not apply to air transport and the text should be replaced with "Not used."

2.4.1.5 It was confirmed that a reference to lithium alloy batteries in new Special Provision A178 was appropriate.

2.4.1.6 The amendments to Part 3 were agreed, subject to a number of editorial changes, including replacement of AXX in A178 with the special provision number and deletion of A153 assigned to multiple entries of UN 1950, as it is no longer used.

2.4.2 Special Provision A130 and Application of Radioactive Material, Excepted Package Label (DGP/22-WP/20)

2.4.2.1 Clarification was sought with respect to Special Provision A130, as amended in DGP/22-WP/6, and the application of the "radioactive material, excepted package" label where the radioactive material meets the definitions and criteria of other classes or divisions. There was concern that the hazard label(s) of the other class would not provide any indication that the substance is also radioactive and that in the event of damage to the package there may be a need to take the radioactivity into account in site clean up. It was therefore proposed that a provision be added to A130 requiring the application of the "radioactive material, excepted package" label in addition to the applicable hazard label(s) applicable to the class/division as described on the dangerous goods transport document.

2.4.2.2 There were opposing views on this proposal; on the one hand, a label played an important role in maintaining safety. On the other hand, introducing such a provision would cause multimodal problems, since the IAEA and the UN Model Regulations do not require the UN number of the radioactive material excepted package to be marked on the package. Concern was also expressed by a number of panel members with the application of a UN number on the "radioactive material, excepted package" handling label other than a UN number applicable to radioactive materials.

2.4.2.3 Based on discussions, it was decided the application of an excepted package handling label would not be required on packages containing material that is fully regulated in a class or division of other than Class 7. An amendment to Special Provision A130 clarifying this was agreed as was the addition of a recommendation that "A130" be indicated on the dangerous goods transport document. An editorial change associated with the word "must" was also made. The proposal, as amended, was agreed.

2.4.3 Transport of Museum Specimens (DGP/22-WP/36)

2.4.3.1 At DGP-WG09, a proposal to add a new special provision allowing museums to ship specimens that are packed with very small quantities of flammable liquid was presented. There was some

support for the proposal, although it was felt by some that the intent and application of the special provision needed to be clarified. The proposed special provision was revised to take account of these concerns and presented to the panel.

2.4.3.2 There was general support for the proposal; however, a few concerns were raised. It was questioned whether a limit should be set for the total quantity of flammable liquid per outer packaging. It was suggested that this was not required as typically these specimens are very small; however, it was agreed providing a limit would be prudent. It was felt by some that the term "museum" specimens was too restrictive and that there might be other specimens such as those sent by universities which could be permitted under this provision. Others felt that expanding beyond museum specimens might open the door for infectious substances to be shipped unregulated. It was agreed replacing "Museum" with "Non-infectious" would address both issues. It was also agreed to include UN 1198, **Formaldehyde solution, flammable** with the list of substances to which the special provision applies.

2.4.3.3 The proposal, as amended, was agreed.

2.4.4 **Special Provision A152 (DGP/22-WP/41)**

2.4.4.1 An amendment to Special Provision A152 in order to ensure that any outer packagings or overpacks used for dry shippers are closed in such a way as to prevent a build-up of pressure within those packagings was made. The proposal was modified to reflect amendments agreed in DGP-WP/22-WP/7. It was noted that similar text was also contained in Packing Instruction 202; accordingly, it was suggested that it should also be amended.

2.4.4.2 One member cautioned against building interpretations into the Instructions. It was agreed that it was important to avoid adding text which was unnecessary to the Instructions, however this text was necessary.

2.4.4.3 The amendment to Special Provision A152 was agreed. The proposal to align the text in the note under paragraph 9 of Packing Instruction 202 with the Special Provision A152 was also agreed.

2.4.5 **Draft amendments to Part 3 of the Technical Instructions to Align with the UN Recommendations — Metal Hydride Storage Systems, UN 3468 (DGP/22-WP/47)**

2.4.5.1 New Special Provision A176, proposed in DGP/22-WP/6 to reflect the decisions taken by the UN Committee, contains the word "conveyance". During DGP-WG09, some members questioned the meaning of this word and whether or not it included aircraft, ships or other modes of transport. A proposal to replace "conveyances" with "vehicle" was presented to the panel. Although there was some support for the proposal, there was also concern with changing the UN text. A definition for conveyance was developed and it was proposed that it be added to the Glossary as an alternative solution. An amended definition was agreed.

2.4.6 **Fuel Cell Vehicles – Consequential Changes (DGP/22-WP/50)**

2.4.6.1 The assignment of **Fuel cell vehicles**, **Fuel cell engines**, and **Fuel cell powered equipment** to UN 3166 in order to align with the 16th Revised Edition of the UN Model Regulations was

made in DGP/22-WP/6. It was suggested, however, that a number of consequential amendments had not been addressed.

2.4.6.2 The new entries were added to the list of proper shipping names in Attachment 1 to the Instructions. The UN number references listed next to the new fuel cell explanation in Attachment 2, Glossary of Terms (agreed at DGP-WG08) were removed since it was agreed there was no specific "Fuel cell" entry in the Dangerous Goods List (Table 3-1). As an alternative, the "†" symbol was added to each fuel cell entry in Table 3-1, indicating that an explanation did exist in the glossary of terms.

2.4.6.3 It was noted that Special Provision A21 gives direction intended to prevent transporting vehicles or equipment as battery powered vehicles or equipment if the vehicle or equipment includes an internal combustion engine that could contain fuel or a fuel tank. An amendment to A21 was agreed to clarify that fuel cell powered vehicles *or* equipment which could contain fuel or a fuel tank must not be shipped as battery powered equipment but rather must be shipped under UN 3166. A consequential amendment to Special Provision A70 was also agreed.

2.4.7 Fuel Cell Vehicles — No Hazard (DGP/22-WP/51)

2.4.7.1 A proposal to amend Special Provision A70 to allow for the extension of allowances granted to new vehicles and engines of flammable gas vehicles which have been purged and pressurized with non-flammable gas or fluid to nullify the hazard of shipment was discussed. It was noted that shipping purged versus non-purged vehicles should be encouraged; however, there were concerns with the proposal. It was cautioned that the non-flammable gas or fluid used to nullify the hazard for shipment could end up meeting the definition of a Division 2.2 gas if no pressure limit is given. It was agreed that some form of evidence that the necessary steps to nullify the hazard had been taken should be required, however there was no consensus on what this form should be. A suggestion that special arrangements be required with the operator was made but it was felt this would be difficult for the operator without any formal guidelines. Another suggestion was to take an approach similar to what is taken for magnetized material in Packing Instruction 902 and dry ice in Packing Instruction 904 whereby a statement from the shipper to provide the operator with written documentation that the necessary steps have been taken is required. Provisions for electronic data processing (EDP) and electronic data interchange (EDI) techniques would also be provided.

2.4.7.2 A new proposal taking these comments into account was proposed. It was agreed, subject to editorial amendments.

2.4.8 Aerosols in Consumer Commodities as Excepted Quantities (DGP/22-WP/55)

2.4.8.1 A proposal to prohibit aerosols consigned as consumer commodities from being carried as excepted quantities was discussed. It was noted that excepted quantities are not permitted for any aerosols listed in Table 3-1. It was also noted that non-toxic aerosols may be consigned to the proper shipping name **Consumer commodity** in accordance with Special Provision A112 and that excepted quantities are permitted when shipping items consigned to Consumer commodity. It was suggested that this was not the intent of the Instructions and that text indicating that aerosols consigned under ID 8000, Consumer commodity are not permitted under excepted quantity provisions should be added to 3;5.1.

2.4.8.2 There was support for this proposal; however, it was questioned why an excepted quantity code should be assigned to consumer commodities in Table 3-1 when only aerosols were

affected. It was suggested that assigning the excepted quantity code "E0" to ID 8000, **Consumer commodity** in Table 3-1 would address the issue raised in the paper more efficiently. This was agreed.

2.4.9 Self-Reactive Substances and Organic Peroxides "Keep Away From Heat" Requirements (DGP/22-WP/69 and DGP/22-IP/1)

2.4.9.1 A proposal to revise the additional provisions applicable to self-reactive substances of Division 4.1 and organic peroxides was discussed at DGP-WG09. Although there was support for the proposal, some members indicated that they would need to seek technical information and advice before being able to take such a decision. It was reported that since the working group meeting, the proposed amendments had been discussed with a representative of a large manufacturer of organic peroxides. Reference was made to a study that was conducted on the un-cooled sea transport of liquid organic peroxides. The conclusion of the study was that such substances could be safely transported in un-cooled shipping containers even if the containers were exposed to extended periods of high temperatures. It was suggested by the presenter that packages containing self-reactive substances and organic peroxides transported by air would never be exposed to extended periods of high temperatures and sunlight as those transported by sea would be. It was further noted by another member that there are organic peroxides which require temperature limits but that these are forbidden for transport by air. Only those which do not require temperature limits are permitted for transport by air. It was therefore believed that the current mandatory requirements, which for the most part apply only to air, were unnecessary and could be removed.

2.4.9.2 Although there was support for this proposal, there was also apprehension by some members. One member referred to consultations with a trade association which represents a significant number of manufacturers of organic peroxides. These consultations provided conflicting information and indicated that the industry members expressed little difficulty in complying with the existing labelling requirement. Although the intention to remove impediments to transport was supported by this member, the method of doing so was questioned and a more conservative approach was preferred.

2.4.9.3 It was felt by some that more time was needed to consult with experts before an informed decision could be made. It was agreed that the proposal would be withdrawn and that the subject would be considered during the next biennium.

2.4.10 Special Provision A164 and Devices Activated During Transport (DGP/22-WP/81)

2.4.10.1 A proposal to permit certain battery-powered devices or equipment to be shipped in an activated state by amending Special Provision A164 was discussed. The panel was advised that proposed revisions to the Model Regulations were agreed at the June 2009 meeting of the UN Sub-Committee allowing transport of certain devices not capable of generating a dangerous evolution of heat. This was in response to similar text added to the lithium battery guidance document prepared by members of the panel.

2.4.10.2 It was noted that although the provisions adopted by the UN Committee this year would normally be considered for adoption in the 2013-2014 edition of the Instructions, it was proposed that these provisions be adopted in the next edition of the Instructions since the issue was initially addressed by members of the DGP.

2.4.10.3 There was general support for the proposal although there was some confusion over the structure in the wording of the provision. Suggestions to clarify the text were made and agreed. Concern was expressed that although the intent of the provision was to address small devices, attempts might be made to apply the provision to larger devices as well, since no limit was proposed. It was noted that a key requirement in the provision is that the device cannot be capable of generating heat; large batteries do generate heat making the provision inapplicable to them. It was suggested that operator approval be required instead of requiring defined standards for electromagnetic radiation to be met. It was noted that temperature loggers are often used by the medical industry and suggested that it would be logistically difficult to deal with the number of requests which would be made.

2.4.10.4 A query was raised as to why the text was not included in a new special provision. It was explained that A164 currently states that devices must be prepared for transport so as to prevent unintentional activation; by adding the new text to A164, devices which are intentionally active during transport would also be addressed. After further discussion it was noted that this provision applied to small lithium batteries that meet the provisions of SP 188 of the UN Model Regulations, and therefore a more appropriate place for it would be in Section II of the packing instructions for lithium ion and lithium metal batteries contained in equipment (Packing Instructions 967 and 970). This was agreed.

2.4.10.5 Although some members could not support the proposal without a limit to the size of the device, the majority did support it. The amendment, as amended, was agreed.

2.4.11 Quantity Limitation for Packages of Chemical Oxygen Generators Transported Aboard Cargo-Only Aircraft (DGP/22-WP/99)

2.4.11.1 The panel was informed of a recent decision within one State to revise the quantity limitation for UN 3356, **Oxygen generator, chemical** from 25 kg “gross” to 25 kg “net” for packages of chemical oxygen generators transported aboard cargo-only aircraft. The revision addressed problems which would occur with the additional weight of overpacks now required in that State when transporting cylinders of oxidizing gasses and packages of chemical oxygen generators.

2.4.11.2 The panel agreed to amend the quantity limit for UN 3356 in Table 3-1 from “25 kg G” to 25 kg. The appropriateness of using a gross amount for any substance in Table 3-1 was queried and it was suggested this issue be studied during the next biennium.

2.4.11.3 The Secretary reported that an addendum to the Technical Instructions containing new State and Operator Variations would be issued during the fourth quarter of 2009. It was suggested that the State concerned provide the Secretariat with a variation to advise of their requirements.

2.5 AMENDMENTS TO PART 4 OF THE TECHNICAL INSTRUCTIONS: PACKING INSTRUCTIONS

2.5.1 Draft amendments of the Technical Instructions to align to the UN Recommendations — Part 4 (DGP/22-WP/7)

2.5.1.1 The meeting reviewed amendments to the Part 4 of the Technical Instructions to reflect the decisions taken by the UN Committee.

2.5.1.2 One member reported that there were inconsistencies in the text applicable to closures as set out in 4;1.1.4. It was noted that the revised text for closures, as shown in 4;1.1.4, was intended to address closures for liquids consistent with the requirements set out in the reformatted packing instructions. However, it was suggested that the requirements for solid substances had been inadvertently made more severe than the requirements for liquids. Amendments to remedy this were agreed.

Packing Instruction 200

2.5.1.3 Although a new key ("ra") for the special packing provisions column of Table 2 in Packing Instruction 200 was adopted in the Model Regulations, it was queried whether it should be adopted in the Instructions. It was suggested that existing Key "w" in the Instructions was similar to " ra" and had been in the Instructions for some time. It was noted that the introduction of "ra" in the Model Regulations was based on alignment with the ADR Regulations which are less restrictive than the requirements in "w". It was agreed that "ra" would not be adopted. It was noted that "w" was positioned under " Periodic inspection" when in fact it should fall under "Gas specific provisions". This was also agreed.

Packing Instruction 202

2.5.1.4 It was queried whether the list of refrigerated liquids which may be carried in closed cryogenic receptacles if certain conditions are met should be removed since it did not exist in the Model Regulations. The inclusion of nitrous oxide and oxygen in refrigerated liquid form in the list was also queried since these substances are forbidden for transport by air. It was noted that the Supplement refers to Packing Instruction 202 for these substances which could be confusing. This confusion highlighted the importance of continuing the review of those packing instructions not addressed in the main packing instruction review completed during the last biennium. It was noted that some work had already done on Classes 1 and 2; members were invited to participate in continuing this work.

2.5.1.5 It was agreed new text addressing flammable refrigerated liquefied gases would not be adopted in the Instructions since these gases are forbidden for transport by air. Although there was some support for keeping the text in order to align with the Model Regulations, it was agreed this would not be prudent as shippers seeing a reference to these gases may be led to mistakenly believe they are permitted. It was recommended that this text be kept in mind when reviewing the supplement.

2.5.1.6 It was noted the note under the compatibility paragraph reflected text in A152 which had been modified. It was suggested the note be modified to align with A152. This was agreed.

2.5.1.7 Two lists of refrigerated liquids which may be transported in open cryogenic receptacles were presented in the proposal: the first list was introduced in the 16th Revised Edition of the Model Regulations, the other already exists in the Instructions. It was agreed not to adopt the list introduced in the Model Regulations but to keep the existing list with the addition of Neon.

2.5.1.8 A number of inconsistencies were raised between existing text in the Instructions and new text adopted in the Model Regulations. A separate proposal to address these was presented and agreed.

2.5.1.9 The amendment, subject to a number of additional editorial changes, was adopted.

Packing Instruction 214

2.5.1.10 Requirements for the packing of small storage systems (i.e. those with a water capacity of less than 1 L) contained in the Instructions did not exist in the Model Regulations. It was agreed they should be retained. It was queried whether packing requirements should exist for storage systems with a water capacity greater than 1 L. It was noted the intent of the requirements for the small storage systems was to provide enough surface area for marking and labelling and to ensure that the package could not get lost. This was consistent with the requirements in Packing Instruction 200 for small cylinders. It was agreed requirements for larger storage systems were not required.

Packing Instruction 602

2.5.1.11 It was suggested Packing Instruction 602 be renumbered 620 so as to align with all other modes. This was agreed.

Packing Instruction Y963

2.5.1.12 An editorial amendment to the figure number referenced in m) was noted.

Packing instructions 377, 681, 876 and 959

2.5.1.13 Amendments to Packing Instructions 377, 681 and 876 are discussed under DGP/22-WP/46 (paragraph 2.5.6) and Packing Instruction 959 under DGP/22-WP/95 (paragraph 2.5.8).

Packing instructions 965 to 970

2.5.1.14 An exception for button cell batteries installed in equipment in Packing Instructions 967 and 970 was agreed. The resulting amendments are shown in Appendix D to the report on Agenda Item 5. The remaining proposed amendments to Packing Instructions 965 to 970 are discussed under Agenda Item 5.3.

2.5.2 **Definition of "Appropriate National Authority of the State in which they are Approved and Filled (DGP/22-WP/14)**

2.5.2.1 The panel discussed the interpretation and application of the provision in Packing Instruction 200 allowing the use of cylinders other than UN marked and certified cylinders if the design, construction, testing, approval and marking conform to the requirements of the appropriate national authority in which they are approved and filled. It was noted that such cylinders may be constructed and approved in accordance with the relevant national authority of one State before being shipped to a second State for usage and filling. It was questioned whether this meant that the approval by the first State is irrelevant for that consignment and that a separate approval is required from the second State, which may not have the resources or requirements for the design, construction, testing and approval of such cylinders.

2.5.2.2 It was noted that the provision was complicated. Its intent was to recognize that non-UN cylinders do exist and should be permitted if they meet the requirements of the appropriate national authority in which they are approved and filled. The term "use" within the provision refers to the use of these cylinders for transport. This use takes into account varying national and regional standards which

may apply for design, manufacturing, testing, and filling approval and recognizes that some States approve different aspects of the cylinders' use, such as filling, for transport. This may result in the need for more for more than one national authority to be contacted in order to conform to the requirements.

2.5.2.3 It was agreed that an exercise to clarify the requirements in Part 6 was a subject which should be raised at the UN.

2.5.3 Transport of Solid EHS in Intermediate Bulk Containers (IBCs) (DGP/22-WP/21)

2.5.3.1 Substances previously unregulated now becoming subject to regulation as a result of the new criteria for environmentally hazardous substances (EHS) in the Instructions was discussed at DGP-WG09. Currently, some solid pesticides which do meet the new EHS criteria are transported by air in IBCs. In order to permit continued use of these IBCs for the purpose of transporting solid substances classified as UN 3077, a proposal to amend new Packing Instruction 956 by adding IBCs to the list of single packagings permitted for UN 3077 was made subject to certain conditions being met. Although there was support for the proposal, some concerns were raised.

2.5.3.2 A new proposal based on comments provided at the working group meeting was presented to the panel and there was general support for it. A number of consequential changes were indicated, however, which were not included in the proposal. These included a definition for IBCs, the addition of extra marking and labelling requirements applicable to IBCs, and a reference to the Model Regulations for Part 6 specifications (in lieu of including them in the Instructions). Several editorial amendments were also noted, including the movement of the list of intermediate bulk containers immediately below the list of single packagings and a reordering of words to align with the Model Regulations.

2.5.3.3 One member suggested that a statement requiring operator approval be added, as some smaller operators might not be able to handle the IBCs. Others questioned the justification of such an approval, since the logistics of transporting other large items of non-dangerous goods was already an every-day practice. It was suggested that a statement requiring prior arrangements with the operator, similar to what is required for dry ice, would be more appropriate but the majority believed this was unnecessary.

2.5.3.4 It was reported that the Model Regulations require the EHS mark in addition to the proper shipping name and the UN number. It was agreed to add this requirement. The Model Regulations also had a "limited period of use" requirement for IBCs; it was agreed that this could be addressed by adding IBCs to an existing requirement in the Instructions (4;1.1.20).

2.5.3.5 The proposal, subject to a number of editorial amendments, was agreed.

2.5.4 Watt-Hour Marking on Lithium Ion Batteries (DGP/22-WP/31)

2.5.4.1 A proposal to permanently except small lithium ion batteries manufactured before 1 January 2009 from the Watt-hour marking, in line with the UN Sub-Committee's decision at its June 2009 meeting, was discussed.

2.5.4.2 There was general support for this proposal, as the issue was addressed at the UN and adopted by other modes. There were several questions raised, however, concerning how to determine when a battery is manufactured and what the Watt-hour rating is for batteries manufactured before 1 January 2009. The panel was reminded that the intent of the requirements was to determine the size of a battery, not to enforce marking. All lithium batteries manufactured after 31 December 2011 are required to be marked with the Watt-hour rating, which removes any ambiguity. In an ideal world, older batteries would be recalled, but this was not a feasible solution. It was noted that batteries have a short shelf life and that these batteries would not be an issue in a few years in any case. Until then, providing guidance on determining whether or not a battery falls below the Watt-hour limit would address the issue. It was suggested this could be done by adding a note with an equation to calculate the Watt-hour using the nominal voltage and capacity in ampere-hours, measurements which are generally marked on batteries.

2.5.4.3 Another query was raised as to whether or not the proposal would also affect provisions for passengers and crew; it was agreed that it would not but that a note with the Watt-hour calculation could also be included under the provisions for consumer electronic devices in Part 8. It was also suggested that Watt-hour be added to the lithium battery guidance document available on the ICAO website.

2.5.4.4 The proposal was agreed.

2.5.5 Requirements For Magnetized Material (DGP/22-WP/42, DGP/22-WP/58, DGP/22-IP/3 and DGP/22-IP/5)

2.5.5.1 A proposal to raise the strength of magnetic materials regulated by the Instructions was discussed. A number of concerns with this proposal were raised, including considerations for small aircraft and helicopters and the possibility of multiple small packages of unregulated material producing a cumulative effect that might be significant for both small and large aircraft.

2.5.5.2 Numerous working groups were convened during the meeting and a new proposal was presented addressing these concerns. The proposal, as amended, was agreed.

2.5.6 Packing Instructions for Chlorosilanes (DGP/22-WP/46)

2.5.6.1 A provision for cylinders meeting the requirements of 4;2.7 as a single packaging (cargo aircraft only) for chlorosilanes of Classes 3, 6.1 and 8 in new Packing Instructions 377, 681 and 876 was proposed at DGP-WG08 and DGP-WG09. Queries were raised regarding UN 1818 and a possible compatibility issue with metal or composite cylinders; no evidence for this was found. It was reported that a similar proposal allowing steel pressure receptacles (excluding Aluminium) was accepted at the 35th session of the UNSCETDG. The proposal was agreed, subject to a specification in each packing instruction that the cylinders be restricted to steel.

2.5.7 Limited Quantities Provisions for Fuel Cell Cartridges (DGP/22-WP/48)

2.5.7.1 A proposal to adopt new provisions to allow the carriage of fuel cell cartridges under the provisions of limited quantities was discussed. The proposal was made on the basis that the Model Regulations currently provide for limited quantity exceptions for all types of fuel cell cartridges. It was

noted that fuel cell cartridges are inherently robust packagings, designed and constructed to withstand conditions of normal use and that Special Provisions A146, A161 and A162 placed additional requirements on the design and construction of fuel cell cartridges providing more safety. Allowing the shipment of limited quantities by air would improve multimodal harmonization, provide for the efficient and rapid transport of consumer and emergency services applications for micro fuel cell cartridges, and remove the competitive disadvantage fuel cell technology has with other portable sources of electric power which could negatively affect their development as an alternative energy source.

2.5.7.2 Although the proposal for limited quantities of fuel cell cartridges containing flammable liquids was supported, the other proposals required further discussion. The quantity limitation of solid corrosive fuel per cartridge provided in the proposal was questioned; it was suggested 0.1 kg was a more consistent amount. It was noted that the quantity currently permitted to be carried by passengers and crew was 0.2 kg; reducing the limit below this amount would not seem logical. Some felt further consideration was needed with respect to fuel cell cartridges containing flammable gases and, in particular, fuel cell cartridges containing water reactive substances. The panel was again reminded that fuel cell cartridges are robust by design and that they must withstand a 1.2 m drop test when unpackaged. It was believed that if the cartridge could pass this test unpackaged it would be safe for small amounts.

2.5.7.3 Although there were some concerns allowing carriage of fuel cell cartridges under the provisions of limited quantities the majority agreed with the proposal, subject to editorial amendments. The proposal was adopted.

2.5.8 **Packing Instruction 959 (DGP/22-WP/95)**

2.5.8.1 A proposal to amend Packing Instruction 959 for GMOs and GMMOs in order to better align with the Model Regulations while maintaining the structure and philosophy of the new packing instruction format in the Instructions was discussed. The proposal was based on amendments already proposed in DGP/22-WP/6.

2.5.8.2 It was explained that the UN had adopted a proposal to make the requirements for GMOs and GMMOs less stringent, as it was felt that the packing and documentation requirements were out of proportion with the risk these substances might pose. For that reason a similar approach was taken as for UN 3373, **Biological substances category B**; packages marked and labelled in accordance with the revised packing instruction for GMOs and GMMOs would not be subject to any other requirements. It was suggested that the packing instruction, as amended in DGP/22-WP/6, retained a quantity limitation which would become redundant with the new provisions and which would make the transport of certain items such as seeds impracticable. In addition, some references to the Technical Instructions which remain applicable were retained.

2.5.8.3 The proposal was agreed, subject to editorial amendments.

2.6 AMENDMENTS TO PART 5 OF THE TECHNICAL INSTRUCTIONS: SHIPPER'S RESPONSIBILITIES

2.6.1 Draft amendments of the Technical Instructions to Align to the UN Recommendations — Part 5 (DGP/22-WP/8)

2.6.1.1 The meeting reviewed amendments to Part 5 of the Technical Instructions to reflect the decisions taken by the UN Sub-Committee.

2.6.1.2 In relation to Class 7 notifications, a member suggested potential confusion between the "competent authority of the country of origin of the shipment" (5;1.2.1.4 a)) versus "State of Origin", noting that a shipment could require a multimodal journey starting by road in one country and by air in a second. It was agreed further clarification was required which would include discussion with the IAEA.

2.6.1.3 A proposal was made to replace "identification of either the consignor or consignee" in 5;1.2.4.1 b) with "address of the shipper or consignee". It was suggested that "address" would result in inconsistency with other modes. It was agreed to replace the text with "identification of either the shipper or consignee".

2.6.1.4 A member noted that text in 5;2.4.9.1 was inconsistent with the Model Regulations. It was also noted that text agreed at DGP-WG09 concerning an indication of net quantity of Class 1 articles with the dangerous goods transport information was missing. The Secretary confirmed these would be corrected in the final report of the meeting.

2.6.2 Location of Shipper and Consignee Identification on Packages (DGP/22-WP/13)

2.6.2.1 A proposal to amend the shipper and consignee identification provisions in 5;2.4.2 to require that the marking on packages be located on the same surface of the package as the proper shipping name was discussed. One member reported a number of dangerous goods incidents in his State which might have been prevented if this were a requirement. It was suggested that it is more likely that when ramp or loading staff check a package for destination (consignee) that the package would be more immediately recognized as being dangerous goods if this marking was next to the proper shipping name, as this is also where the hazard labels are required to be.

2.6.2.2 There was an initial lack of support for this proposal. It was suggested that the word "adequate" in "if the package dimensions are adequate" was ambiguous and could cause difficulties. Additional marking requirements would be inconsistent with other modes, causing additional problems. However, no objections were raised when it was suggested to change the proposal from a mandatory requirement to a recommended practice. The proposal was agreed, as amended.

2.6.3 Application of Hazard Label for Environmentally Hazardous Substances (DGP/22-WP/37)

2.6.3.1 Confusion was reported from shippers and airlines who believe that the environmentally hazardous substances (EHS) mark takes the place of the Class 9 hazard label for packages containing UN 3077, **Environmentally hazardous substance, solid, n.o.s.** and UN 3082, **Environmentally hazardous substance, liquid, n.o.s.** An amendment to Part 5;2.4.9 was proposed to clarify this. It was

noted that the current provisions in 5;2.4.9 reflect the Model Regulations and that a similar proposal would need to be made at the December meeting of the UN Sub-Committee.

2.6.3.2 It was agreed this amendment would add clarity to the requirements and that it should be adopted.

2.6.4 **Documentation Requirements (DGP/22-WP/68)**

2.6.4.1 A provision for electronic data transmission in lieu of written documentation for commodities that do not require a dangerous goods transport document was discussed. Four items of dangerous goods were cited as not requiring complete dangerous goods transport information: **Biological substance, Category B** (UN 3373), **Carbon dioxide, solid** (UN 1845) (dry ice), dangerous goods in excepted quantities, and radioactive materials, excepted quantities. It was noted that while each of these commodities had some identified condition for information which may be required from the shipper, the detail of that information and the mandatory or optional requirement for a document varied slightly. It was therefore also proposed that this information be standardized for each of the four commodities named.

2.6.4.2 While there was support for the provision of electronic data transmission in lieu of written documentation for commodities which do not require a dangerous goods transport document, concern was expressed that the amendments proposed to standardize the required information resulted in new requirements for the provision of information for shippers of **Biological substances, Category B** (UN 3373) and dangerous goods in expected quantities. In response to these concerns, the proposal was revised to apply only to UN 1845 and to radioactive material, excepted packages. Following further editorial amendments, the proposal was agreed.

2.6.5 **Revision to the Information Required on the Dangerous Goods Transport Document (DGP/22-WP/72) and to the Marking Requirement on a Dangerous Goods Package (DGP/22-WP/73)**

2.6.5.1 Proposals to clarify that "ID" must precede the UN number on the dangerous goods transport document and must be marked on the package when shipping consumer commodities was discussed. It was noted the requirement does exist in 3;2.1 but that adding it to the documentation requirements in 5;4 and the package markings requirements in 5;2 would add clarity. The proposals were agreed.

2.6.6 **Handling of Non-Dangerous Goods Suspected of being Undeclared Dangerous Goods (DGP/22-WP/83)**

2.6.6.1 A proposal to require confirmation from shippers that their consignment did not contain dangerous goods was discussed. It was proposed that confirmation would be required should the name or description of any of the items in the consignment appear in the list of potential dangerous goods shown in 7;6. The proposal was prompted by many occurrences of undeclared dangerous goods offered for shipment in one State, particularly through an express postal service in that State.

2.6.6.2 There was some support for this proposal if it were to be an optional rather than a mandatory requirement, and some felt the Dangerous Goods List (Table 3-1) should also be referred to. Others felt the requirement would place an extra unnecessary burden on the operators when accepting

consignments. It was noted that the list in 7;6 was meant as an aid to recognize undeclared dangerous goods and was not comprehensive; such a requirement should not refer to an indicative list. It was also suggested that it would be inappropriate to impose a mandatory dangerous goods requirement on shippers who do not ship dangerous goods and might not necessarily have knowledge of dangerous goods regulations. It was noted that non-dangerous goods are not subject to Annex 18. It was suggested that this issue may be one to be considered by Facilitation and/or Security.

2.6.6.3 The proposer noted that the comments were appreciated and would be incorporated into a new proposal during the next biennium.

2.6.7 Adding the Consignee's Telephone Number on the Transport Document for Shipments of Radioactive Material (DGP/22-WP/85) and Change of Wording to Prevent the Denial of Shipments of Radioactive Material (DGP/22-WP/87)

2.6.7.1 Two proposals addressing an amendment agreed at DGP-WG08 recommending that the telephone number of the consignee, in the State of Destination, be included on the transport document for the transport of radioactive material were discussed. It was reported that although the agreed text denoted an optional requirement in English, when translated into other languages it can be interpreted as being mandatory. Amendments to clarify that this requirement is optional were therefore proposed.

2.6.7.2 The issue of whether or not the requirement should be mandatory was revisited, as one State felt that the telephone number of the consignee would facilitate coordination between the consignor and the consignee and help expedite the transport of radioactive material, particularly when dealing with the short shelf life of radioisotopes and pharmaceutical products. It was felt that mandating an operator to accept was not the prerogative of the Instructions and that the optional requirement should remain.

2.6.7.3 The amendment proposed in DGP/22-WP/87, subject to a small modification, was agreed.

2.7 AMENDMENTS TO PART 6 OF THE TECHNICAL INSTRUCTIONS: PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

2.7.1 Draft amendments of the Technical Instructions to align to the UN Recommendations — Part 6 (DGP/22-WP/9)

2.7.1.1 The meeting reviewed amendments to Part 6 of the Technical Instructions to reflect the decisions taken by the UN Committee. The amendments were approved without comment.

2.8 AMENDMENTS TO PART 7 OF THE TECHNICAL INSTRUCTIONS: OPERATOR'S RESPONSIBILITIES

2.8.1 Draft amendments of the Technical Instructions to align to the UN Recommendations — Part 7 (DGP/22-WP/10)

2.8.1.1 The meeting reviewed amendments to Part 7 of the Technical Instructions to reflect the decisions taken by the UN Committee. The amendments were approved without comment.

2.8.2 Electronic Check-in and Ticket Purchase (DGP/22-WP/23)

2.8.2.1 A proposal to strengthen the requirements for the provision of information to passengers in respect of dangerous goods in baggage was discussed. It was suggested the use of the Internet to purchase tickets, to check in, and the use of automated check-in machines at the airport or by telephone made traditional methods of providing information to passengers obsolete. New text in Part 7;5.1 was developed to address this. The issue of third-party ticket sales online (e.g. Expedia), where an operator would have no input as to what information is provided, was addressed in the proposal by a new requirement in Part 8;1.1.

2.8.2.2 There was general support for this proposal although there was concern that it would be difficult to implement the requirement that a check in process could not be completed until the passenger indicated that they had understood the restriction on dangerous goods in baggage. It was agreed that the implementation of this requirement would be up to the operator.

2.8.2.3 The amendment was agreed, subject to the adoption of a transition phase whereby the requirements would not come into effect until the 2013-2014 Edition of the Technical Instructions.

2.8.3 Information to the Pilot-in-Command (DGP/22-WP/26)

2.8.3.1 The meeting was reminded of the provision in 7;4.1 f) which states that the net quantity or gross mass, if applicable, of each package is not required with the written information to the pilot-in-command when the net quantity or gross mass is not required on the dangerous goods transport document. It was suggested that the text does not address what to do if the net quantity is not required on alternative documentation, as in the case of dry ice. A small amendment to 7;4.1 f) was proposed to clarify this situation. The amendment, subject to a minor modification to clarify that alternative written documentation is not always required, was agreed.

2.8.3.2 It was noted that there was an inconsistency between the English and the Spanish version of the Instructions which would be addressed by the Secretariat.

2.8.4 Review of Requirement related to Information to the Pilot-in-Command (DGP/22-WP/27)

2.8.4.1 It was suggested a review of the requirements of Part 7;4 of the Technical Instructions concerning the information to the pilot-in-command was necessary in order to determine whether they were still effective or if the current level of detail might be impeding the expeditious transfer of

information. It was proposed that a working group consisting of panel members and other interested parties such as airport rescue fire services be convened during the next biennium to review these provisions.

2.8.4.2 Concern was expressed by one member that revising the requirements may result in not enough information being provided which could adversely affect safety. He was not opposed to a new requirement to provide a summary, as long as the information currently required is maintained.

2.8.4.3 There was much support for the convening of a working group to review the current requirements. It was suggested that terms of reference be developed so that the review could be considered as a non-recurrent work item by the ANC. This would be done through correspondence following DGP/22.

2.8.5 **Signed Confirmation on the NOTOC (DGP/22-WP/28)**

2.8.5.1 It was suggested that the requirement for the person responsible for loading the aircraft to indicate on the written information to the pilot in command (NOTOC) that there was no evidence of any damage to or leakage from the packages loaded on the aircraft did not address packages which are first loaded into a unit load device and not directly onto the aircraft. An amendment to Part 7;4.1.3 was proposed in order to clarify this.

2.8.5.2 Although there was support for the intent of the proposal it was generally felt that the way it was written would make the current requirement too stringent and put an undue burden on the operator. It was suggested that further input from operators was required before an informed decision could be made. It was agreed that the subject would be addressed during future work on the NOTOC.

2.8.6 **Retention of Documentation (DGP/22-WP/29)**

2.8.6.1 A proposal was made to clarify that the requirement for the retention of documentation by an operator at the point of acceptance applies only when a dangerous goods transport document is required and not when alternative documentation can be used, such as the air waybill in the case of dry ice. The amendment was adopted subject to a slight modification.

2.8.7 **Excess Baggage Carried as Cargo (DGP/22-WP/39)**

2.8.7.1 A proposal to permit excess baggage consigned as cargo to contain items of dangerous goods that are permitted in a passenger's checked baggage was discussed. The amendment was intended for baggage that a passenger intended to check in but discovered was in excess of the normal allowance permitted. It was reported that, in some cases, passengers use companies at the passenger terminal to ship the excess baggage as cargo rather than paying the airline's excess baggage rates. It was suggested that the passenger provisions be extended to this excess baggage. However, care had to be taken to differentiate between excess baggage described above and baggage that a passenger intentionally ships in advance.

2.8.7.2 The proposal was accepted subject to the addition of a new definition in 1;3 for "excess baggage".

2.8.8 **Provision of Information to Staff (DGP/22-WP/40)**

2.8.8.1 A proposal was made to require that provisions to aid recognition of undeclared dangerous goods be provided to cargo and passenger reservation staff in addition to check-in staff and cargo acceptance staff. It was argued that it would be preferable to try to prevent the shipper from sending undeclared dangerous goods in the first place and for passengers to be advised of what they can and cannot take with them before they travel to the airport. This could be achieved through cargo and passenger reservation staff, as they are often the first point of contact with shippers and passengers.

2.8.8.2 There was much support for this proposal. It was clarified that the intent of the proposal was to provide information and not to train. It was suggested the proposal be extended to cargo and passenger sales staff.

2.8.8.3 The proposal, as amended, was agreed.

2.8.9 **Requirements for Radioactive Material (DGP/22-WP/59)**

2.8.9.1 A proposal was made requiring the operator to provide information to the pilot-in-command confirming that any radioactive material carried is properly separated from persons on board according to Table 7-2 or Table 7-3, as applicable. It was suggested incidents had occurred where minimum requirements had not been met and that this requirement would help ensure the material is properly loaded.

2.8.9.2 There was no support for this proposal. It was noted that loading was the responsibility of the operator and that responsibilities should not be confused. Some members indicated that they had never had problems reported with these loading requirements. It was also felt that the proposal was too vague in that it was difficult to determine what would constitute confirmation from the operator. No amendments to the Instructions were made.

2.8.9.3 The proposal was withdrawn.

2.8.10 **Handling and Loading of Packages Containing Liquid Dangerous Goods (DGP/22-WP/63)**

2.8.10.1 Problems related to transporting liquid dangerous goods in cargo bulk holds were reported. Leakage from consignments of liquid dangerous goods damaged by loading systems in the bulk hold often resulted in expensive repair costs in addition to aircraft down time. The panel was asked if prohibiting the carriage of liquid dangerous goods in the bulk hold should be considered or if this might lead to undeclared dangerous goods.

2.8.10.2 Many members reported similar problems with transporting liquid dangerous goods (and liquid non-dangerous goods) but felt that prohibition was not an option. Shippers invest in preparing their consignments for dangerous goods acceptance; accordingly, operators should have proper processes and procedures established for handling of all liquids so as to prevent damage. Suggestions for addressing the problem included false floors to cover up nails, airworthiness advisory notices asking engineers to secure nails, and providing information to operators stressing the importance of restricting movement during transport. It was agreed that education rather than prohibition was the best way to address this issue.

2.8.11 **Limits on Transport Index (TI) and Radiation Levels for Packages and Overpacks (DGP/22-WP/64)**

2.8.11.1 This paper was withdrawn by the presenter.

2.8.12 **Proposed Amendment to the Provision of Information at Cargo Acceptance Areas Requirements (DGP/22-WP/66)**

2.8.12.1 Proposed rewording of the requirement for notices giving information about the transport of dangerous goods at cargo acceptance areas was agreed. It was felt that the new wording clarified the requirements.

2.8.13 **Reference to the Cargo Compartment Classification (DGP/22-WP/74)**

2.8.13.1 It was noted that various classes of cargo compartments are referred to in the Instructions but not defined. They were, however, described in the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481). It was suggested references to Doc 9481 be included in the form of a note under 7;2.1.2 and 7;2.4.1.1. It was further suggested that a reference be added to the Supplement in S-7;2.2.1. The proposal, subject to an editorial amendment replacing "defined" with "described", was agreed.

2.8.14 **Segregation of Explosives (DGP/22-WP/78)**

2.8.14.1 A discrepancy was reported in the segregation of explosive requirements which made the requirements in the Technical Instructions less restrictive than other modes. It was suggested that this was not the intent of the panel and that the requirements should be aligned. The discrepancy identified was in 7;2.2.5 whereby explosives of Division 1.4, compatibility Group B are permitted to be stowed next to other explosives of Division 1.4 with different compatibility groups, while the UN Model Regulations prohibit such combinations. Two proposals were presented to the panel: Proposal 1 introduced a table which would clearly indicate which explosives are not allowed to be loaded together, similar to the general segregation of Table 7-1. Proposal 2 was an amendment to the existing text of 7;2.2.2.5.

2.8.14.2 There was much support for the table. The table was based on explosives which are normally allowed to be transported by air; it was suggested that an expanded version of the table could be developed for inclusion in the Supplement which would include explosives normally forbidden for transport by air. It was agreed that this could be considered in the future work of the panel.

2.8.14.3 Proposal 1 was agreed.

2.8.15 **Pallets Prepared for Class C Cargo Compartments (DGP/22-WP/82)**

2.8.15.1 An amendment to Part 7;2.7.3 to provide a means to ensure that pallets prepared for Class C cargo compartments were not erroneously loaded in other compartments was discussed.

2.8.15.2 It was suggested it would be more appropriate to amend 7;2.4.1 b) by requiring the words "Class C compartment" on a ULD tag when that ULD is determined by the appropriate national authority to meet the Class C aircraft cargo compartment standards. This was agreed.

2.8.16 Transportation of Dangerous Goods in Non-Pressurized Cargo Holds (DGP/22-WP/84)

2.8.16.1 A proposal to follow up an amendment agreed at DGP-WG09 on the transport of dangerous goods in non-pressurized cargo holds was made. The amendment agreed at DGP-WG09 indicated that there would be a large pressure differential at high altitudes. It was proposed that a possible pressure differential be indicated so as to provide a clearer warning. This was agreed.

2.8.16.2 A separate proposal was made to mandate the current recommended requirement for confirmation of the suitability of the packagings from the shipper. There was little support for this proposal; the panel agreed to maintain the confirmation as a recommendation, although a small editorial amendment was agreed.

2.9 AMENDMENTS TO PART 8 OF THE TECHNICAL INSTRUCTIONS: PROVISIONS CONCERNING PASSENGERS AND CREW

2.9.1 Draft Amendments of the Technical Instructions to Align to the UN Recommendations — Part 8 and Attachment 2 (DGP/22-WP/11)

2.9.1.1 The meeting reviewed amendments to Part 8 and Attachment 2 of the Technical Instructions to reflect the amendments agreed by DGP-WG08 and DGP-WG09. The amendments were approved without comment.

2.9.2 Notification to the Pilot-In-Command of the Location and Number of Oxygen or Air Cylinders Carried by Passengers (DGP/22-WP/15)

2.9.2.1 A proposal to add a provision requiring that the pilot-in-command be notified of the number of oxygen or air cylinders loaded on an aircraft and their loading location(s) on that aircraft was discussed. There was general support for this proposal, although it was suggested that "notified" might suggest the information should appear on a NOTOC. It was agreed that this was not the intent and that "inform" would be more appropriate. Passing on the information in the event of a crew change was considered to be a redundant requirement; the sentence was removed.

2.9.2.2 The amendment, as modified, was adopted.

2.9.3 "Blue Flame" Lighters (DGP/22-WP/19)

2.9.3.1 It was reported that a type of cigarette lighter which produces a very intense, focused flame and had the capability to cut through metal had been identified. It was proposed that a note be added to the provisions for dangerous goods carried by passengers and crew prohibiting these types of lighters.

2.9.3.2 The proposed note identified these lighters as “blue flame” lighters. Concern was raised in that it would be difficult for passengers to make a distinction between these so-called “blue flame” lighters and regular ones. It was suggested that more information be included in the passenger provisions to describe them. Others felt that there were other types of similar devices which could be included as prohibited for carriage by passenger and crew and that perhaps more time should be spent addressing them all. The proposal was withdrawn with the intent that it would be re-visited during the next biennium.

2.9.4 Fuel Cell Cartridges Carried in Checked Baggage (DGP/22-WP/49)

2.9.4.1 A proposal to consider allowing fuel cell cartridges in checked baggage was discussed. The panel was reminded that the issue was first raised at DGP/21, but it was felt that a restriction was necessary to ensure that inadvertent actuation did not take place in an unsupervised environment such as a baggage compartment. The panel was updated on experience gained from transporting fuel cartridges since DGP/21. It was reported that more than 2,000 fuel cell cartridges had been successfully carried as carry-on baggage without trouble by fuel cell company personnel and more than 150,000 cartridges had been shipped without incident as cargo on both cargo and passenger aircraft since DGP/21.

2.9.4.2 It was suggested that the restriction against carrying fuel cell cartridges in checked baggage provided no additional safety improvement over carry-on baggage since they did not have the ability to be actuated or to short-circuit or to charge batteries on their own. It was reported that testing at the United States Federal Aviation Administration (FAA) Technical Center had also taken place but that the results were not yet available.

2.9.4.3 Although there was support for permitting fuel cell cartridges containing flammable liquids, many were wary of permitting fuel cartridges containing substances of other classes, particularly those containing water reactive substances, until more experience with these cartridges could be gained.

2.9.4.4 A new proposal distinguishing between the different types was presented for the panel’s consideration. It was agreed, subject to the prohibition of fuel cell cartridges containing water reactive substances and to some editorial amendments.

2.9.5 Fuel Cell Systems Used to Power Portable Electronic Devices (DGP/22-WP/54)

2.9.5.1 A proposal which included clarification with respect to fuel cells with integral reservoirs that are refuelled by use of non-attached fuel cell cartridges was presented at DGP-WG09. During the discussion on the proposals, queries were raised with respect to the design and test standards that apply to external (non-attached) fuel cell cartridges. Since DGP-WG09, the provisions of the IEC standard were reviewed to determine the criteria applicable to external fuel cell cartridges and to cartridges that are designed to remain attached to a fuel cell. It was reported that the review identified that although the IEC specification requires that all cartridges (internal or external) meet the same design and test criteria for leakproofness and shocks caused by drops, more rigorous test requirements apply to the valve for external fuel cell cartridges.

2.9.5.2 It was suggested the results of this review justified a standardized treatment of all types of fuel cell cartridges, both those designed to remain attached and those not designed to remain attached. Accordingly, an amendment to remove the prohibition on fuel cell refills in 8;1.1.2 r) 2) was proposed.

The proposal also addressed concerns that many terms were used in the provisions for fuel cartridges which might result in confusion for both airline personnel and passengers.

2.9.5.3 The amendment, subject to a distinction between "fuel cell" and "fuel cell cartridge", was adopted.

2.9.6 **Self-inflating Safety Vests (DGP/22-WP/61)**

2.9.6.1 Self inflating motorcycle safety vests equipped with small carbon dioxide gas cylinders had been considered for carriage by passengers by one operator. It was suggested that these vests meet a similar design concept as self-inflating life-jackets which are permitted for carriage by passengers and crew (8;1.1.2 p)) with the approval of the operator. The panel was asked to confirm that these vests could be accepted under 8;1.1.2 p). Although no objections were raised, it was felt that clarification could be provided through a more general statement which would encompass other similar items. It was suggested this could be considered during the next biennium.

2.9.7 **Carriage of Electroshock Weapons (Tasers) (DGP/22-WP/67)**

2.9.7.1 The addition of text into Part 8 of the Instructions to prohibit the carriage of Electroshock Weapons (Tasers) in passenger baggage other than by law enforcement personnel was proposed. If accepted, allowance for law enforcement personnel would be provided subject to approval of the appropriate national authority of the State of the Operator.

2.9.7.2 There was general support for the proposal although some felt that they should never be permitted in the cabin without additional requirements which would prevent inadvertent activation. Others felt that the carriage of Tasers was a security issue and not one of dangerous goods.

2.9.7.3 A new proposal, providing examples of the types of dangerous goods which might be contained in such weapons and removing the provision for law enforcement personnel, was adopted. It was agreed the Secretary would verify the use of the trade name "Taser".

2.10 RECOMMENDATION

2.10.1 In light of the foregoing discussions, the meeting developed the following recommendation:

Recommendation 2/1 — Amendment to the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284)

That the Technical Instructions be amended as indicated in the appendix to the report on this agenda item.

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APPENDIX

PROPOSED AMENDMENTS TO THE TECHNICAL INSTRUCTIONS

Part 1

GENERAL

Chapter 1

SCOPE AND APPLICABILITY

Parts of this Chapter are affected by State Variations AE 3, BE 2, BE 4, BE 5, CA 6, CA 12, CH 3, DE 1, DE 4, FR 3, GB 2, IN 1, IR 1, IT 1, IT 5, NL 3, NL 6, US 1, VC 1, VC 2, VC 3, VU 2; see Table A-1

Note.— Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these Instructions, are published as a separate Manual (*United Nations* Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) *(ST/SG/AC.10/11/Rev.~~4~~ 5), the contents of which are:*

Part I. Classification procedures, test methods and criteria relating to explosives of Class 1;

Part II. Classification procedures, test methods and criteria relating to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2; and

Part III. Classification procedures, test methods and criteria relating to substances or articles of Class 2, Class 3, Class 4, Division 5.1, Class 8 and Class 9.

Appendices. Information common to a number of different types of tests and national contacts for test details.

1.1 GENERAL APPLICABILITY

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Editorial Note.— Additional proposed amendments to 1;1.1, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

1.1.3 General exceptions

1.1.3.1 Except for 7;4.2, these Instructions do not apply to dangerous goods carried on an aircraft where the dangerous goods are:

. . .

f) required for the propulsion of the means of transport or the operation of its specialized equipment during transport (e.g. refrigeration units) or that are required in accordance with the operating regulations (e.g. fire extinguishers) (see 2.2).

g) contained within items of excess baggage being sent as cargo provided that:

1) the excess baggage has been consigned as cargo by or on behalf of a passenger;

2) the dangerous goods may only be those that are permitted by and in accordance with 8;1.1.2 to be carried in checked baggage;

3) the excess baggage is marked with the words “Excess baggage contained as cargo”;

Chapter 2

LIMITATION OF DANGEROUS GOODS ON AIRCRAFT

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2.2 EXCEPTIONS FOR DANGEROUS GOODS OF THE OPERATOR

2.2.1 The provisions of these Instructions do not apply to the following:

a) articles and substances which would otherwise be classified as dangerous goods but which are required to be aboard the aircraft in accordance with the pertinent airworthiness requirements and operating regulations or that are authorized by the State of the Operator to meet special requirements;

b) aerosols, alcoholic beverages, perfumes, colognes, safety matches and liquefied gas lighters carried aboard an aircraft by the operator for use or sale on the aircraft during the flight or series of flights, but excluding non-refillable gas lighters and those lighters liable to leak when exposed to reduced pressure;

c) dry ice intended for use in food and beverage service aboard the aircraft.;

d) electronic devices such as electronic flight bags, personal entertainment devices, credit card readers, containing lithium metal or lithium ion cells or batteries and spare lithium batteries for such devices carried aboard an aircraft by the operator for use on the aircraft during the flight or series of flights, provided that the batteries meet the provisions of 8;1.1.2 q). Spare lithium batteries must be individually protected so as to prevent short circuits when not in use. Conditions for the carriage and use of these electronic devices and for the carriage of spare batteries must be provided in the operations manual and/or other appropriate manuals as will enable flight crew, cabin crew and other employees to carry out their responsibilities.

2.2.2 Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in 2.2.1 a), or articles and substances referred to in 2.2.1 a) which have been removed for replacement, must be transported in accordance with the provisions of these Instructions, except that when consigned by operators, they may be carried in containers specially designed for their transport, provided such containers are capable of meeting at least the requirements for the packagings specified in these Instructions for the items packed in the containers.

2.2.3 Unless otherwise authorized by the State of the Operator, articles and substances intended as replacements for those referred to in 2.2.1 b) and c) must be transported in accordance with the provisions of these Instructions.

2.2.4 Unless otherwise authorized by the State of the Operator, battery-powered devices with installed batteries and spare batteries intended as replacements for those referred to in 2.2.1 d) must be transported in accordance with the provisions of these Instructions.

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Chapter 3

GENERAL INFORMATION

Parts of this Chapter are affected by State Variation BE 1; see Table A-1

3.1 DEFINITIONS

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Editorial Note.— Proposed amendments to the definition for “Approval” are shown in Appendix B to the report on Agenda Item 5.

Approval. For the transport of Class 7 material:

Multilateral approval. The approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country. ~~The term "through or into" specifically excludes "over", i.e. the approval and notification requirements must not apply to a country over which radioactive material is carried in an aircraft, provided that there is no scheduled stop in that country.~~

Unilateral approval. The approval of a design which is required to *be* given by the competent authority of the country of origin of the design only.

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ASTM. The American Society for Testing and Materials (ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States).

Baggage. Personal property of passengers or crew carried on an aircraft by agreement with the operator.

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Cargo. For the purposes of these Instructions, ~~A~~any property carried on an aircraft other than mail~~, stores~~ and accompanied or mishandled baggage.

Note.— This definition differs from the definition of "cargo" given in Annex Annex 9 — Facilitation.

Cargo aircraft. Any aircraft, other than a passenger aircraft, which is carrying goods or property.

Cargo transport unit. A multimodal freight container or portable tank.

Closed cargo transport unit. A cargo transport unit which totally encloses the contents by permanent structures with complete and rigid surfaces. Cargo transport units with fabric sides or tops are not considered closed cargo transport units.

. . .

Dangerous goods accident. An occurrence associated with and related to the transport of dangerous goods by air which results in fatal or serious injury to a person or major property or environmental damage.

Dangerous goods incident. An occurrence other than a dangerous goods accident associated with and related to the transport of dangerous goods by air, not necessarily occurring on board an aircraft, which results in injury to a person, property or environmental damage, fire, breakage, spillage, leakage of fluid or radiation or other evidence that the integrity of the packaging has not been maintained. Any occurrence relating to the transport of dangerous goods which seriously jeopardizes an aircraft or its occupants is also deemed to be a dangerous goods incident.

Note.— A dangerous goods accident or incident may also constitute an aircraft accident or incident as specified in Annex 13 — Aircraft Accident and Incident Investigation.

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Editorial Note.— Proposed amendments to the definition for "Exemption" are shown in Appendix B to the report on Agenda Item 5.

Excess baggage. Baggage which a passenger has presented to check-in as accompanied checked baggage, but which exceeds the passenger's baggage allowance specified by the operator and which is consequently consigned as cargo in order to be sent to the same destination as the passenger.

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Freight forwarder. A person or organization who offers the service of arranging the transport of cargo by air.

. . .

GHS. The ~~first~~ third revised edition of the *Globally Harmonized System of Classification and Labelling of Chemicals*, published by the United Nations as document ST/SG/AC.10/30/~~Rev. 2~~Rev. 3.

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Intermediate bulk containers (IBCs). ~~(See UN Recommendations, Chapter 1.2). Not permitted for air transport.~~ Any rigid or flexible portable packaging, other than those specified in Part 6;3 of these Instructions, as described in Chapter 6.5 of the UN Model Recommendations, that is designed for mechanical handling and is resistant to the stresses produced in handling and transport, as determined by tests.

Note.— IBCs are only authorized by these Instructions for UN 3077, ***Environmentally hazardous substance, solid, n.o.s.*** *as provided in Packing Instruction 956.*

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ISO (standard). An international standard published by the International Organization for Standardization (ISO — 1, rue de ~~Varembé~~Voie-Creuse, CH-~~1204~~ 1211 Geneva 20, Switzerland).

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Liquids. Dangerous goods which at 50°C have a vapour pressure of not more than 300 kPa (3 bar), which are not completely gaseous at 20°C and at a pressure of 101.3 kPa, and which have a melting point or initial melting point of 20°C or less at a pressure of 101.3 kPa. A viscous substance for which a specific melting point cannot be determined must be subjected to the ASTM D 4359-90 test; or to the test for determining fluidity (penetrometer test) prescribed in section 2.3.4 of Annex A of the *European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)* (United Nations publication: ECE/TRANS/~~175~~202).

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Manual of Tests and Criteria. The ~~fourth~~ fifth revised edition of the United Nations publication entitled *Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria* (ST/SG/AC.10/11/~~REV.4~~REV.5).

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Maximum normal operating pressure. For the transport of Class 7 material, the maximum pressure above atmospheric pressure at mean sea level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during transport.

Metal hydride storage system. A single complete hydrogen storage system, including a receptacle, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transport of hydrogen only.

Multiple-element gas containers (MEGCs). (See UN Recommendations Chapter 1.2). Not permitted for air transport.

Net explosive mass (NEM). The total mass of the explosive substances, without the packagings, casings, etc. (net explosive quantity (NEQ), net explosive contents (NEC), or net explosive weight (NEW) are often used to convey the same meaning).

Net quantity. The mass or volume of the dangerous goods contained in a package excluding the mass or volume of any packaging material, except in the case of explosive articles and of matches where the net mass is the mass of the finished article excluding packagings.

Open cryogenic receptacle. ~~A metal vacuum insulated vessel, dewar or flask that is vented to the atmosphere to prevent pressure build-up~~ A transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated liquefied gas.

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Pressure drums. *(*See UN Recommendations, Chapter 1.2). Not permitted for air transport.

Pressure receptacle. A collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage systems and bundles of cylinders;

. . .

Remanufactured packagings include:

a) metal drums that:

i) are produced as a UN type from a non-UN type;

ii) are converted from one UN type to another UN type; or
iii) undergo the replacement of integral structural components (such as non-removable heads);

b) plastic drums that:

i) are converted from one UN type to another UN type (e.g. 1H1 to 1H2); or

ii) undergo the replacement of integral structural components.

Remanufactured drums are subject to the same requirements of these Instructions as apply to a new drum of the same type.

Remanufactured large packaging. (See UN Recommendations, Chapter 1.2). Not permitted for air transport.

Reused large packaging. (See UN Recommendations, Chapter 1.2). Not permitted for air transport.

. . .

Stores (supplies). a) Stores (supplies) for consumption; and b) Stores (supplies) to be taken away.

Stores (supplies) for consumption. Goods, whether or not sold, intended for consumption by the passengers and the crew on board aircraft, and goods necessary for the operation and maintenance of aircraft, including fuel and lubricants.

Stores (supplies) to be taken away. Goods for sale to the passengers and the crew of aircraft with a view to being landed.

Items that meet the classification as dangerous goods and which are transported in accordance with Part 1;2.2.2 or Part 1;2.2.3 are considered as "cargo".

Tank. A tank container, portable tank, a road tank-vehicle, a rail tank-wagon or a receptacle intended to contain solids, liquids, or gases and has a capacity of not less than 450 litres when used for the transport of ~~substances of Class 2~~ gases as defined in 2;2.1.1. ~~A tank container must be capable of being carried on land or on sea and of being loaded and discharged without the need of removal of its structural equipment, must possess stabilizing members and tie-down attachments external to the shell, and must be capable of being lifted when full.~~

Note ~~1~~. — These Technical Instructions *do not permit the use of a tank for the transport of radioactive material by air.*

~~*Note 2. — The definition of "tank" does not include packages of uranium hexafluoride.*~~

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Transport index (TI) assigned to a package, overpack or freight container. For the transport of Class 7 material, a number which is used to provide control over radiation exposure.

Through or into. For the transport of Class 7 material, through or into the countries in which a consignment is transported but specifically excluding countries "over" which a consignment is carried by air, provided that there are no scheduled stops in those countries.

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Chapter 4

TRAINING

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4.2 TRAINING CURRICULA

4.2.1 Personnel must ~~receive~~ be ~~training~~ trained in the requirements commensurate with their responsibilities. Such training must include:

a) general familiarization training — which must be aimed at providing familiarity with the general provisions;

b) function-specific training — which must provide detailed training in the requirements applicable to the function for which that person is responsible; and

c) safety training — which must cover the hazards presented by dangerous goods, safe handling and emergency response procedures.

4.2.2 ~~Training must be provided or verified upon the employment of personnel identified in the categories specified in Table 1-4.~~ Personnel identified in the categories specified in Tables 1-4 or 1-5 must be trained or training must be verified prior to the person performing any duty specified in Table 1-4 or 1-5.

4.2.3 Recurrent training must ~~take place~~ be provided within 24 months of previous training to ensure knowledge is current. However, if recurrent training is completed within the final three months of validity of previous training, the period of validity extends from the date on which the recurrent training was completed until 24 months from the expiry date of that previous training.

4.2.4 A test to verify understanding must be ~~undertaken~~ provided following training. Confirmation that the test has been completed satisfactorily is required.

4.2.5 A record of training must be maintained which must include:

a) the individual's name;

b) the most recent training completion date;

c) a description, copy or reference to training materials used to meet the training requirements;

d) the name and address of the organization providing the training; and

e) evidence which shows that a test has been completed satisfactorily.

The records of training must be retained by the employer for a minimum period of 36 months from the most recent training completion date and must be made available upon request to the employee or appropriate national authority.

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Chapter 5

DANGEROUS GOODS SECURITY

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5.2 DANGEROUS GOODS SECURITY TRAINING

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5.2.4 Records of all dangerous goods security training undertaken should be kept by the employer and made available to the employee or appropriate national authority, ~~if~~ upon request~~ed~~. Records should be kept by the employer for a period of time established by the appropriate national authority.

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5.4 RADIOACTIVE MATERIAL

For radioactive material, the provisions of this Chapter are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material[1] and ~~of~~ the IAEA ~~INFCIRC/225 (Rev.4) are applied.~~ circular on "The Physical Protection of Nuclear Material and Nuclear Facilities"[2] are applied.

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Chapter 6

GENERAL PROVISIONS CONCERNING CLASS 7

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6.1 SCOPE AND APPLICATION

6.1.1 These Instructions establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These Instructions are based on the IAEA *Regulations for the Safe Transport of Radioactive Material*, (~~2005~~ 2009 Edition), Safety Standards Series No. TS-R-1, IAEA, Vienna (~~2005~~2009). Explanatory material ~~on the 1996 edition of TS-R-1~~ can be found in *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material* (2005 Edition), Safety Standard Series No. TS-G-1.1 (~~ST-2~~Rev. 1), IAEA, Vienna (~~2002~~2008). The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risk.

6.1.2 The objective of these Instructions is to establish requirements that must be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation ~~during the~~ in the transport of radioactive material. This protection is achieved by requiring:

a) containment of the radioactive contents;

b) control of external radiation levels;

c) prevention of criticality; and

d) prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to the limits of the contents for packages and aircraft and to the performance standards, which are applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing requirements on the design and operation of packages and on the maintenance of the packagings, including consideration of the nature of the radioactive contents. Finally, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities.

6.1.3 These Instructions apply to the transport of radioactive material by air, including transport that is incidental to the use of the radioactive material. Transport comprises all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of the radioactive material and packages. A graded approach is applied to the performance standards in these Instructions that ~~is~~ are characterized by three general severity levels:

a) routine conditions of transport (incident free);

b) normal conditions of transport (minor mishaps); and

c) accident conditions of transport.

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[1] IAEACIRC/274/Rev.1, IAEA, Vienna (1980).

[2] IAEACIRC/225/Rev.4 (Corrected), IAEA, Vienna (1999). See also "Guidance and Considerations for the Implementation of INFCIRC/225/Rev.4, the Physical Protection of Nuclear Material and Nuclear Facilities, IAEA-TECDoc-967/Rev.1.

6.1.5 Specific provisions for the transport of excepted packages

6.1.5.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles and empty packages as specified in 2;7.2.4.1.1 are subject only to the following provisions of Parts 5 to 7:

a) the applicable provisions specified in 5;1.1 i), 5;1.2.4, 5;1.4, 5;1.6.3, 5;1.7, 5;2.2, 5;2.3, 5;2.4.2~~, 5;2.4.5.1 a), 5;2.4.5.1 e), 5;3.2.11 b)~~, 5;3.2.11 e), 5;3.3, 5;3.4~~5;4.1.4.1 a)~~, 5;4.4, 7;2.5 ~~and~~, 7;3.2.2 and 7;4.4;

b) the requirements for excepted packages specified in 6;7.3; and

c) if the excepted package contains fissile material, one of the fissile exceptions provided by 2;7.2.3.5 must apply and the requirement of 6;7.6.2 must be met.

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6.2 RADIATION PROTECTION PROGRAMME

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6.2.3 The nature and extent of the measures to be employed in the programme must be related to the magnitude and likelihood of radiation exposure. The programme must incorporate the requirements in 6.2.2 and 6.2.4 to 6.2.7, 7;2.9.1.1 and 7;2.9.1.2. Programme documents must be available, on request, for inspection by the relevant competent authority.

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6.2.7 ~~Workers~~Personnel must ~~receive~~ be appropriately train~~ing~~ed ~~concerning~~ in the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that of other persons who might be affected by their actions.

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Part 2

CLASSIFICATION OF DANGEROUS GOODS

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INTRODUCTORY CHAPTER

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2. CLASSES, DIVISIONS, PACKING GROUPS — DEFINITIONS

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Class 9: Miscellaneous dangerous substances and articles, including environmentally hazardous substances

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3. UN NUMBERS AND PROPER SHIPPING NAMES

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3.5 A mixture or solution composed of a single predominant substance identified by name in Table 3-1 and one or more substances not subject to these Instructions and/or traces of one or more substances identified by name in Table 3-1 must be assigned the UN number and proper shipping name of the predominant substance named in Table 3-1, unless:

a) the mixture or solution is identified by name in Table 3-1 in which case this name must be applied; or

b) the name and description of the substance named in Table 3-1 specifically indicates that it applies only to the pure substance; or

c) the hazard class or division, subsidiary risk(s), physical state or packing group of the solution or mixture is different from that of the substance named in Table 3-1; or

d) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Table 3-1.

If b), c) or d) is applicable, the mixture or solution must be treated as a dangerous substance not specifically listed by name in Table 3-1.

Note.— Although traces of substances may not need to be taken into account for classification purposes, those traces may affect the properties of the substance and do need to be taken into account when considering the compatibility requirements of 4;1.1.3.

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4. PRECEDENCE OF HAZARD CHARACTERISTICS

4.1 The precedence of hazards table (Table 2-1) must be used to determine the class of a substance, mixture or solution having more than one risk, when it is not named in Table 3-1. For goods having multiple risks, which are not specifically listed by name in Table 3-1, the most stringent packing group denoted to the respective hazards of the goods takes precedence over other packing groups, irrespective of Table 2-1. The correct ~~packing group~~ class or division to be used is ~~also~~ shown at the intersection of the two lines in Table 2-1. The correct packing group to be used is also shown at the intersection of the two lines. The precedence of hazard characteristics of the following have not been dealt with in Table 2-1, as the primary characteristics always take precedence~~. The correct packing group to be used is also shown at the intersection of the two lines in Table 2-1~~:

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4.2 Apart from radioactive material in excepted packages (where the other hazardous properties take precedence), radioactive material having other hazardous properties must always be classified in Class 7 and the subsidiary risk must also be identified. For radioactive material in excepted packages, Special Provision A130 applies.

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Chapter 1

CLASS 1 — EXPLOSIVES

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1.2 DEFINITIONS

For the purposes of these Instructions, the following definitions apply:

a) ***Explosive substance*** is a solid or liquid substance (or a mixture of substances) which is in itself capable, by chemical reaction, of producing gas at such a temperature and pressure and at such a speed as to cause damage to the surroundings. Pyrotechnic substances are included even when they do not evolve gases.

b) ***Pyrotechnic substance*** is a substance or a mixture of substances designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as the result of non-detonative, self-sustaining, exothermic, chemical reactions.

c) ***Explosive article*** is an article containing one or more explosive substances.

d) ***Phlegmatized*** means that a substance (or "phlegmatizer") has been added to an explosive to enhance its safety in handling and transport. The phlegmatizer renders the explosive insensitive, or less sensitive, to the following actions: heat, shock, impact, percussion or friction. Typical phlegmatizing agents include, but are not limited to: wax, paper, water, polymers (such as chlorofluoropolymers), alcohol and oils (such as petroleum jelly and paraffin).

Note.— Explanations for a number of other terms used in connection with explosives can be found in Attachment 2 to these Instructions.

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Table 2-2. Classification codes

Description of substance or article to be classified	*Compatibility group*	*Classification code*
Primary explosive substance	A	1.1A
. . .		
Substances or articles so packed or designed that any hazardous effects arising from accidental functioning are confined within the package unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder or prohibit fire fighting or other emergency response in the immediate vicinity of the package	S	1.4S

Note 1.— Articles of Compatibility Groups D and E may be fitted or packed together with their own means of initiation provided that such means have at least two effective protective features designed to prevent an explosion in the event of accidental functioning of the means of initiation. Such articles and packages must be assigned to Compatibility Groups D or E.

Note 2.— Articles of Compatibility Groups D and E may be packed together with their own means of initiation, which do not have two effective protective features when, in the opinion of the appropriate national authority of the State of Origin, the accidental functioning of the means of initiation does not cause the explosion of an article under normal conditions of transport. Such packages must be assigned to Compatibility Groups D or E.

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Chapter 2

CLASS 2 — GASES

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2.1.3 This class comprises compressed gases; liquefied gases; dissolved gases; refrigerated liquefied gases; mixtures of one or more gases with one or more vapours of substances of other classes; articles charged with a gas; and aerosols. (For aerosols, see 1;3.1).

~~*Note 1.— Carbonated beverages and inflated balls used for sports are not subject to these Instructions.*~~

Note ~~2.~~—"Cryogenic liquid" means the same as "refrigerated liquefied gas".

2.1.4 Pressures of all kinds relating to receptacles (such as test pressure, internal pressure, safety-valve opening pressure) are always indicated in gauge pressure (pressure in excess of atmospheric pressure); however, the vapour pressure of substances is always expressed in absolute pressure.

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2.2 DIVISIONS

2.2.1 Substances of Class 2 are assigned to one of three divisions based on the primary hazard of the gas during transport.

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b) Division 2.2 — Non-flammable, non-toxic gases.

Gases which:

i) are asphyxiant — gases which dilute or replace the oxygen normally in the atmosphere; or

ii) are oxidizing — gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does. ~~The oxidizing ability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO 10156:1996 and ISO 10156-2:2005)~~; or

Note.— In 2.2.1 b) ii), "gases which cause or contribute to the combustion of other material more than air does" means pure gases or gas mixtures with an oxidizing power greater than 23.5 per cent as determined by a method specified in ISO 10156:1996 or 10156-2:2005.

. . .

2.2.2 Gases of Division 2.2 are not subject to these Instructions if they are transported at a pressure less than 200 kPa at 20°C and are not liquefied or refrigerated liquefied gases.

2.2.3 Gases of Division 2.2 are not subject to these Instructions when contained in the following:

a) foodstuffs, including carbonated beverages (except UN 1950);

b) balls intended for use in sports;

c) tyres which meet the provisions of Special Provision A59; or

d) light bulbs, provided they are packaged so that the projectile effects of any rupture of the bulb will be contained within the package.

. . .

2.4 MIXTURES OF GASES

For the classification of gas mixtures into one of the three divisions (including vapours of substance from other classes), the following principles must be used:

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d) Oxidizing ability is determined either by tests or by calculation methods adopted by the International Standards Organization (see the Note in 2.2.1 b) and ISO 10156:1996 and ISO 10156-2:2005).

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Chapter 3

CLASS 3 — FLAMMABLE LIQUIDS

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3.3 DETERMINATION OF FLASH POINT

The following ~~is a list of documents describing~~ methods for determining the flash point of ~~substances in Class 3~~ flammable liquids may be used:

International standards

— ISO 1516
— ISO 1523
— ISO 2719
— ISO 13736
— ISO 3679
— ISO 3680

National standards

Editorial Note.— The following is moved from the end of this paragraph:

~~*United States* (~~American Society for Testing Materials International, ~~1916 Race Street, Philadelphia, PA 19103)~~ 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959

- ASTM D-3828-93, Standard Test Methods for Flash Point by Small Scale Closed Tester
- ASTM D-56-93, Standard Test Method for Flash Point by Tag Closed Tester
- ASTM D3278-96, Standard Test Methods for Flash Point of Liquids by Setaflash Closed-Cup Apparatus
- ASTM D-0093-96, Standard Test Methods for Flash Point by Pensky-Martens Closed Cup Tester.

~~*France* (~~Association française de normalisation, AFNOR, ~~Tour Europe, 92049 Paris La Défense)~~, 11, rue de Pressensé, 93571 La Plaine Saint-Denis Cedex

- French Standard NF M 07–019
- French Standards NF M 07–011 / NF T 30–050 / NF T 66–009
- French Standard NF M 07–036

~~*Germany* (~~Deutsches Institut für Normung, Burggrafenstrasse 6, D-10787 Berlin~~)~~

- Standard DIN 51755 (flash points below 65°C)

~~Standard DIN EN 22719 (flash points above 5°C)~~
~~Standard DIN 53213 (for varnishes, lacquers and similar viscous liquids with flash points below 65°C)~~

~~*Netherlands*~~

~~ASTM D93-90~~
~~ASTM D3278-89~~
~~ISO 1516~~
~~ISO 1523~~
~~ISO 3679~~
~~ISO 3680~~

~~*Russian Federation* (~~State Committee of the Council of Ministers for Standardization, 113813, GSP, Moscow, M-49 Leninsky Prospect, 9)

- GOST 12.1.044-84

~~*United Kingdom* (British Standards Institution, Customer Services, 389 Chiswick High Road, London, N7 8LB)~~

~~British Standard BS EN 22719~~
~~British Standard BS 2000 Part 170~~

3.4 DETERMINATION INITIAL BOILING POINT

The following methods for determining the initial boiling point of flammable liquids may be used:

International standards

- ISO 3924
- ISO 4626
- ISO 3405

National standards

American Society for Testing Materials International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, Pennsylvania, USA 19428-2959

- ASTM D86-07a, Standard Test Method for Distillation of Petroleum Products at Atmospheric Pressure
- ASTM D1078-05, Standard Test Method for Distillation Range of Volatile Organic Liquids

Further acceptable methods

— Method A.2 as described in Part A of the Annex to Commission Regulation (EC) No 440/2008[3]

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Chapter 4

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

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4.3 SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION (DIVISION 4.2)

4.3.1 Definitions and properties

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4.3.1.2 Self-heating of a substances~~, leading to spontaneous combustion, is caused by~~ is a process where the gradual reaction of ~~the~~ that substance with oxygen (in the air) ~~and the~~ generates heat. ~~developed not being conducted away sufficiently rapidly to the surroundings. Spontaneous combustion occurs when the rate of heat production exceeds the rate of heat loss and the auto-ignition temperature is reached.~~ If the rate of heat production exceeds the rate of heat loss, then the temperature of the substance will rise which, after an induction time, may lead to self-ignition and combustion.

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Chapter 5

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

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Table 2-7. List of currently assigned organic peroxides in packages

Note.— Peroxides to be transported must fulfil the classification and the control and emergency temperatures (derived from the self-accelerating decomposition temperature (SADT)) as listed.

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control temperature (°C)*	*Emergency temperature (°C)*	*UN generic entry*	*Notes*
. . .									
tert-Amylperoxy-3,5,5-trimethylhexanoate	≤100							FORBIDDEN	~~3~~

[3] Commission Regulation (EC) No 440/2008 of 30 May 2008 laying down test methods pursuant to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Official Journal of the European Union, No. L 142 of 31.05.2008, p.1-739 and No. L 143 of 03.06.2008, p.55).

Organic peroxide	*Concentration (per cent)*	*Diluent type A (per cent)*	*Diluent type B (per cent) (Note 1)*	*Inert solid (per cent)*	*Water (per cent)*	*Control tempera-ture (°C)*	*Emergency tempera-ture (°C)*	*UN generic entry*	*Notes*
. . .									
Di-(2-tert-butylperoxyisopropyl) benzene(s)	>42-100			≤57				3106	
Di-(2-tert-butylperoxyisopropyl) benzene(s)	≤42			≥58				Exempt	29
. . .									
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	>90-100							3103	
2,5-Dimethyl-2,5-di-(tert-butylperoxy)hexane	>52-~~100~~90	≥10						3105	
Editorial Note.— Remove space before "hexane" below.									
2,5-Dimethyl-2,5-di-(tert-butylperoxy)-hexane	≤77			≥23				3108	

. . .

Editorial Note.— Proposed amendments to Chapter 6, which related to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

Chapter 7

CLASS 7 — RADIOACTIVE MATERIAL

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7.1 DEFINITIONS

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7.1.3 Definitions of specific terms

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Fissile ~~material~~ nuclides. Uranium-233, uranium-235, plutonium-239, and plutonium-241~~, or any combination of these radionuclides~~. Fissile material is a material containing any of the fissile nuclides. ~~Excepted~~ Excluded from ~~this~~ the definition ~~are~~ of fissile material are:

a) natural uranium or depleted uranium which is unirradiated; and

b) natural uranium or depleted uranium which has been irradiated in thermal reactors only.

. . .

Table 2-12. Basic radionuclides values for individual radionuclides

Radionuclide (atomic number)	*A_1 (TBq)*	*A_2 (TBq)*	*Activity concentration for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
. . .				
Krypton (36)				
Kr-79	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{5}
Kr-81	4 × 101	4 × 101	1 × 104	1 × 107
. . .				

. . .

7.2.3 Determination of other material characteristics

7.2.3.1 *Low specific activity (LSA) material*

7.2.3.1.1 (Reserved)

7.2.3.1.2 LSA material must be in one of three groups:

a) LSA-I

i) uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides;

ii) natural uranium, depleted uranium, natural thorium, or their compounds or mixtures, ~~providing they~~ that are unirradiated and in solid or liquid form;

iii) radioactive material for which the A_2 value is unlimited, excluding fissile material ~~classified as fissile according to~~ not excepted under 7.2.3.5; or

iv) other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in 7.2.2.1 to 7.2.2.6, excluding fissile material ~~classified as fissile according to~~ not excepted under 7.2.3.5.

b) LSA-II

i) water with tritium concentration up to 0.8 TBq/L; or

ii) other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A_2/g for solids and gases, and 10^{-5} A_2/g for liquids.

c) LSA-III — solids (e.g. consolidated wastes, activated materials), excluding powders meeting the requirements of 7.2.3.1.3, in which:

i) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.);

ii) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed 0.1 A_2; and

iii) the estimated average specific activity of the solid, excluding any shielding material, does not exceed 2×10^{-3} A_2/g.

. . .

7.2.3.4 *Low dispersible radioactive material*

7.2.3.4.1 The design for low dispersible radioactive material requires multilateral approval. Low dispersible radioactive material must be such that the total amount of this radioactive material in a package, taking into account the provisions of 6;7.7.14, must meet the following requirements:

a) The radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;

b) If subjected to the tests specified in 6;7.19.3 and 6;7.19.4, the airborne release in gaseous and particulate forms of up to 100 μm aerodynamic equivalent diameter would not exceed 100 A_2. A separate specimen may be used for each test; and

c) If subjected to the test specified in 7.2.3.1.4, the activity in the water would not exceed 100 A_2. In the application of this test, the damaging effects of the tests specified in b) above must be taken into account.

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7.2.3.5 *Fissile material*

7.2.3.5.1 Packages containing fissile ~~radionuclides~~ material must be classified under the relevant entry of Table 2-11 ~~for fissile material unless~~, the description of which includes the words "FISSILE" or "fissile-excepted". Classification as "fissile-excepted" is allowed only if one of the conditions a) to d) of this paragraph is met. Only one type of exception is allowed per consignment (see also 6;7.6.2).

a) A mass limit per consignment, provided that the smallest external dimension of each package is not less than 10 cm, such that:

$$\frac{\text{mass of uranium - 235(g)}}{X} + \frac{\text{mass of other fissile material (g)}}{Y} < 1$$

where X and Y are the mass limits defined in Table 2-14, provided that ~~the smallest external dimension of each package is not less than 10 cm and that~~ either:

i) each individual package contains not more than 15 g of fissile ~~material~~ nuclides; for unpackaged material, this quantity limitation must apply to the consignment being carried in or on the conveyance;

ii) the fissile material is a homogeneous hydrogenous solution or mixture where the ratio of fissile nuclides to hydrogen is less than 5 per cent by mass; or

iii) there are not more than 5 g of fissile ~~material~~ nuclides in any 10 L volume of material.

Table 2-14. Consignment mass limits for exceptions from the requirements for packages containing fissile material

Fissile material	*Fissile material mass (g) mixed with substances having an average hydrogen density less than or equal to water*	*Fissile material mass (g) mixed with substances having an average hydrogen density greater than water*
Uranium 235 (X) Other fissile material (Y)	400 250	290 180

~~Neither b~~Beryllium ~~nor deuterium~~ must not be present in quantities exceeding 1 per cent of the applicable consignment mass limits provided in Table 2-14, except ~~for deuterium in natural concentration in hydrogen~~ where the concentration of beryllium in the material does not exceed 1 gram beryllium in any 1 000 grams.

Deuterium must also not be present in quantities exceeding 1 per cent of the applicable consignment mass limits provided in Table 2-14 except where deuterium occurs up to natural concentration in hydrogen.

b) Uranium enriched in uranium-235 to a maximum of 1 per cent by mass, and with a total plutonium and uranium-233 content not exceeding 1 per cent of the mass of uranium-235, provided that the fissile ~~material is~~ nuclides are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it must not form a lattice arrangement;

c) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2 per cent by mass, with a total plutonium and uranium-233 content not exceeding 0.002 per cent of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2;

d) ~~Packages containing, individually, a total plutonium mass not more than 1 kg, of which not more than 20 per cent by mass may consist of plutonium-239, plutonium-241 or any combination of those radionuclides.~~Plutonium containing not more than 20 per cent of fissile nuclides by mass up to a maximum of 1 kg of plutonium per consignment. Shipments under this exception must be under exclusive use.

7.2.4 Classification of packages

7.2.4.1 The quantity of radioactive material in a package must not exceed the relevant limits for the package type as specified below.

7.2.4.1.1 *Classification as excepted packages*

7.2.4.1.1.1 Packages may be classified as excepted packages if:

a) they are empty packagings having contained radioactive material;

b) they contain instruments or articles in limited quantities as specified in Table 2-15;

c) they contain articles manufactured of natural uranium, depleted uranium or natural thorium; or

d) they contain radioactive material in limited quantities as specified in Table 2-15.

7.2.4.1.1.2 A package containing radioactive material may be classified as an excepted package provided that the radiation level at any point on its external surface does not exceed 5 μSv/h.

7.2.4.1.1.3 Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified under UN 2911 — **Radioactive material, excepted package — instruments** or **articles**~~, provided that~~ only if:

a) the radiation level at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h; and

b) each instrument or article bears the marking “RADIOACTIVE” except:

i) radioluminescent time-pieces or devices;

ii) consumer products that either have received regulatory approval according to 1;6.1.4 b) or do not individually exceed the activity limit for an exempt consignment in Table 2-12 (column 5), provided such products are transported in a package that bears the marking “RADIOACTIVE” on an internal surface in such a manner that warning of the presence of radioactive material is visible on opening the package;

c) the active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material must not be considered to be an instrument or manufactured article); and

d) the limits specified in columns 2 and 3 of Table 2-15 are met for each individual item and each package, respectively.

7.2.4.1.1.4 Radioactive material ~~with an activity~~ in forms other than as specified in 7.2.4.1.1.3 and with an activity not exceeding the limits specified in column 4 of Table 2-15 may be classified under UN 2910 — **Radioactive material, excepted package — limited quantity of material**, provided that:

a) the package retains its radioactive contents under routine conditions of transport; and

b) the package bears the marking “RADIOACTIVE” on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

7.2.4.1.1.5 An empty packaging which had previously contained radioactive material ~~with an activity not exceeding the limit specified in column 4 of Table 2-15~~ may be classified under UN 2908 — **Radioactive material, excepted package — empty packaging**~~, provided that~~ only if:

a) it is in a well-maintained condition and securely closed;

b) the outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;

c) the level of internal non-fixed contamination, when averaged over any 300 cm^2, does not exceed:

(i) 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters; and

(ii) 40 Bq/cm^2 for all other alpha emitters; and

d) any labels which may have been displayed on it in conformity with 5;3.2.6 are no longer visible.

~~7.2.4.1.2~~7.2.4.1.1.6 Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN 2909, **Radioactive material, excepted package — articles manufactured from natural uranium** or **depleted uranium** or **natural thorium**~~, provided that~~ only if the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.

Table 2-15. Activity limits for excepted packages

	Instruments or article		*Materials*
Physical state of contents	*Item limits**	*Package limits**	*Package limits**
Solids			
Special form	10^{-2} A_1	A_1	10^{-3} A_1
Other form	10^{-2} A_2	A_2	10^{-3} A_2
Liquids	10^{-3} A_2	10^{-1} A_2	10^{-4} A_2
Gases			
Tritium	2×10^{-2} A_2	2×10^{-1} A_2	2×10^{-2} A_2
Special form	10^{-3} A_1	10^{-2} A_1	10^{-3} A_1
Other forms	10^{-3} A_2	10^{-2} A_2	10^{-3} A_2

* For mixtures of radionuclides, see 7.2.2.4 to 7.2.2.6.

7.2.4.2 *Classification as low specific activity (LSA) material*

7.2.4.2.1 Radioactive material may only be classified as LSA material if the definition of LSA in 7.1.3 and the conditions of 7.2.3.1 ~~and~~, 4;9.2.1 and 7;2.9.2 are met.

7.2.4.3 *Classification as surface contaminated object (SCO)*

7.2.4.3.1 Radioactive material may be classified as SCO if the definition of SCO in 7.1.3 and the conditions of 7.2.3.2~~.1 and~~, 4;9.2.1 and 7;2.9.2 are met.

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Chapter 8

CLASS 8 — CORROSIVE SUBSTANCES

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8.2 ASSIGNMENT OF PACKING GROUPS

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8.2.4 In assigning the packing group to a substance in accordance with 8.2.2, account must be taken of human experience in instances of accidental exposure. In the absence of human experience, the packing group must be based on data obtained from experiments in accordance with OECD Guideline~~s~~ for the Testing of Chemicals No. 404, *Acute Dermal Irritation/Corrosion*, ~~1992~~ 2002 or No. 435, *In Vitro Membrane Barrier Test Method for Skin Corrosion*, 2006. A substance

which is determined not to be corrosive in accordance with OECD Guideline for the Testing of Chemicals No. 430, *In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER)*, 2004 or No. 431, *In Vitro Skin Corrosion: Human Skin Model Test*, 2004 may be considered not to be corrosive to skin for the purposes of these Instructions without further testing.

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Chapter 9

CLASS 9 — MISCELLANEOUS DANGEROUS SUBSTANCES AND ARTICLES, INCLUDING ENVIRONMENTALLY HAZARDOUS SUBSTANCES

9.1 DEFINITION

9.1.1 *Class 9 substances and articles (miscellaneous dangerous substances and articles)* are substances and articles which, during air transport, present a danger not covered by other classes.

9.1.2 *Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)* are micro-organisms and organisms in which genetic material has been purposely altered through genetic engineering in a way that does not occur naturally.

9.2 ASSIGNMENT TO CLASS 9

9.2.1 Class 9 includes, inter alia:

a) Environmentally hazardous substances (aquatic environment) are those that meet the criteria in 2.9.3 of the UN Model Regulations or that meet criteria in international regulations or national regulations established by the appropriate national authority in ~~a country~~ the State of ~~o~~Origin, transit or destination.

Substances or mixtures dangerous to the aquatic environment not otherwise classified under these Instructions~~, but classified by the shipper as dangerous goods (see Special Provision A97),~~ must be assigned to Packing Group III and designated:

UN 3077 Environmentally hazardous substance, solid, n.o.s.; or
UN 3082 Environmentally hazardous substance, liquid, n.o.s.

b) Elevated temperature substances (i.e. substances that are transported or offered for transport at temperatures equal to or exceeding 100°C in a liquid state or at temperatures equal to or exceeding 240°C in a solid state (these substances may only be carried under 1;1.1).

c) GMMOs or GMOs which do not meet the definition of toxic substances (see 6.2) or infectious substances (see 6.3) ~~but which are capable of altering animals, plants or microbiological substances in a way not normally the result of natural reproduction. They~~ must be assigned to UN 3245. GMMOs or GMOs are not subject to these Instructions when authorized for use by the appropriate national authorities of the States of Origin, transit and destination. Genetically modified live animals must be transported under terms and conditions of the appropriate national authorities of the States of Origin and destination.

d) Magnetized material: Any material which, when packed for air transport, has a maximum magnetic field strength ~~of 0.159 A/m or more at a distance of 2.1 m from any point on the surface of the assembled package (see also Packing Instruction 902)~~ sufficient to cause a compass deflection of more than 2 degrees at a distance of 2.1 m from any point on the surface of the assembled package. The magnetic field strength at the compass producing a 2 degree deflection is taken to be 0.418 A/m (0.00525 Gauss).

The magnetic field strength must be measured with a magnetic compass sensitive enough to read a 2 degree variation, preferably in 1 degree increments or finer, or using a Gauss meter having a sensitivity sufficient to measure magnetic fields greater than 0.0005 Gauss within a tolerance of plus or minus 5 per cent, or by an equivalent means.

Compass measurements must be taken in an area free from magnetic interference other than the earth's magnetic field. When using a compass, the material and the compass must be aligned in an East/West direction. Gauss meter measurements must be in accordance with the manufacturer's instructions. Measurements are taken while the

packaged material is rotated through 360 degrees in its horizontal plane while maintaining a constant distance (2.1 m or 4.6 m as referred to in Packing Instruction 902) between the measuring device and any point on the outside surface of the package. Shielding may be used to reduce the package's magnetic strength.

Note.— Masses of ferro-magnetic metals such as automobiles, automobile parts, metal fencing, piping and metal construction material, even if not meeting the definition of magnetized material may ~~be subject to the operator's special stowage requirements since they may~~ affect aircraft ~~instruments, particularly the~~ compasses~~.~~ ~~Additionally,~~, as may packages or items ~~of material~~ which individually do not meet the definition of magnetized material but cumulatively may ~~do so, may also be subject to the operator's special stowage requirements~~ have a magnetic field strength of a magnetized material.

e) Aviation regulated solid or liquid: Any material which has narcotic, noxious or other properties such that, in the event of spillage or leakage on an aircraft, extreme annoyance or discomfort could be caused to crew members so as to prevent the correct performance of assigned duties.

Some examples of articles in Class 9 are:

— Engines, internal combustion;

— Life-saving appliances, self-inflating;

— Battery-powered equipment or vehicle.

Some examples of substances in Class 9 are:

— Blue, brown or white asbestos;

— Carbon dioxide, solid (dry ice);

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— Zinc dithionite.

Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

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Chapter 1

GENERAL

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1.2 PROPER SHIPPING NAME

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1.2.7 Generic or "not otherwise specified" (n.o.s.) names

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1.2.7.1.1 The technical name must be a recognized chemical or biological name or other name currently used in scientific and technical handbooks, journals and texts. Trade names must not be used for this purpose. In the case of pesticides, only ISO common name(s), other name(s) in the World Health Organization (WHO) *Recommended Classification of Pesticides by Hazard and Guidelines to Classification,* or the name(s) of the active substance(s) may be used.

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1.3 MIXTURES OR SOLUTIONS

Note.— Where a substance is specifically listed by name in Table 3-1, it must be identified in transport by the proper shipping name in Table 3-1. Such substances may contain technical impurities (for example, those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification must be considered a mixture or solution (see 2;3.2 and 2;3.5).

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1.3.2 A mixture or solution composed of a single predominant substance identified by name in Table 3-1 and one or more substances not subject to these Instructions and/or traces of one or more substances identified by name in Table 3-1 must be assigned the UN number and proper shipping name of the predominant substance named in Table 3-1, unless:

a) the mixture or solution is specifically identified by name in Table 3-1; or

b) the name and description of the substance named in Table 3-1 specifically indicates that it applies only to the pure substance; or

c) the hazard class or division, subsidiary risk(s), physical state or packing group of the solution or mixture is different from that of the substance named in Table 3-1; or

d) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Table 3-1.

Note.— Although traces of substances may not need to be taken into account for classification purposes, those traces may affect the properties of the substance and do need to be taken into account when considering the compatibility requirements of 4;1.1.3.

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Chapter 2

ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

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2.1 ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

Editorial Note.— Proposed amendments to the descriptions for Columns 11 and 13, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

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Proposed amendments to Table 3-1 are presented in Attachments A and B to the report on this agenda item. Attachment A contains the amendments in UN number order and Attachment B contains the same proposed amendments in alphabetical order.

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Chapter 3

SPECIAL PROVISIONS

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Table 3-2. Special provisions

TIs	*UN*	

Editorial Note.— Proposed amendments to Special Provisions A1 and A2, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

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A14	~~The label conforming to Figure 5-14 may be used until 31 December 2010.~~Not used.

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A21	This entry only applies to vehicles and equipment which are powered by wet batteries, sodium batteries or lithium batteries and which are transported with these batteries installed. Examples of such vehicles and equipment are electrically-powered cars, lawn mowers, wheelchairs and other mobility aids. Vehicles or equipment that also contain an internal combustion engine must be consigned under the ~~entry~~ entries **Engines, internal combustion, flammable gas powered** or **Engines, internal combustion, flammable liquid powered** or **Vehicle, ~~(~~flammable gas powered~~)~~** or **Vehicle, ~~(~~flammable liquid powered~~)~~**, as appropriate. Hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed, must be consigned under the entries UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate. Vehicles or equipment powered by a fuel cell engine must be consigned under the entries **Vehicle, fuel cell, flammable gas powered** or **Vehicle, fuel cell, flammable liquid powered**, or **Engine, fuel cell, flammable gas powered** or **Engine, fuel cell, flammable liquid powered** as appropriate.

TIs	*UN*	
. . .		
A44		The entry chemical kit or first aid kit is intended to apply to boxes, cases, etc., containing small quantities of one or more compatible items of dangerous goods which are used, for example, for medical, analytical or testing or repair purposes. The packing group assigned to the kit as a whole must be the most stringent packing group assigned to any individual substance in the kit. The assigned packing group must be shown on the dangerous goods transport document. The only dangerous goods which are permitted in the kits are substances which may be transported as: a) excepted quantities as specified in column 9 of Table 3-1, provided the inner packagings and quantities are as prescribed in 5.1.2 and 5.2.1 a); or b) limited quantities under 3;4.1.2.
. . .		
A47	(219)	Genetically modified micro-organisms (GMMOs) and genetically modified organisms (GMOs)~~, which meet the definition of an infectious substance and the criteria for inclusion in Division 6.2 in accordance with 2;6, must be transported as UN 2814, UN 2900 or UN 3373, as appropriate~~ packed and marked in accordance with Packing Instruction 959 are not subject to any other requirements in these Instructions. If GMMOs or GMOs meet the definition in 2;6 of a toxic substance or an infectious substance and the criteria for inclusion in Division 6.1 or 6.2, the requirements in these Instructions for transporting toxic substances or infectious substances apply.
. . .		

Editorial Note.— Proposed amendments to Special Provisions A62, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

A70		Internal combustion or fuel cell engines being shipped either separately or incorporated into a vehicle, machine or other apparatus, the fuel tank of which has never contained any fuel and the fuel system of which is completely empty of fuel, or that are powered by a fuel that does not meet the classification criteria for any class or division, and without batteries or other dangerous goods, are not subject to these Instructions. ~~The words "not restricted" and the special provision number A70 must be provided on the air waybill when an air waybill is issued.~~ Flammable gas powered internal combustion or fuel cell engines being shipped without batteries or other dangerous goods either separately or incorporated into a vehicle, machine or other apparatus that have contained fuel but have been flushed, purged and filled with a non-flammable gas or fluid to nullify the hazard are not subject to these Instructions provided that: a) the shipper has made prior arrangements with the operator; b) the shipper has provided the operator with written or electronic documentation stating that the flushing, purging and filling procedure has been followed and that the final contents of the engine(s) have been tested and verified to be non-flammable; and c) the final pressure of the non-flammable gas used to fill the system does not exceed 200 kPa at 20°C. Multiple engines may be shipped in a unit load device or other type of pallet provided that the shipper has made prior arrangements with the operator(s) for each shipment. When this special provision is used, the words "not restricted" and the special provision number A70 must be provided on the air waybill when an air waybill is issued.
. . .		

TIs	*UN*	
A78		Radioactive material with a subsidiary risk must: a) be labelled with subsidiary risk labels corresponding to each subsidiary risk exhibited by the material in accordance with the relevant provisions of 5;3.2; corresponding placards must be affixed to cargo transport units in accordance with the relevant provisions of 5;3.6; b) be allocated to Packing Groups I, II or III, as and if appropriate, by application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk. For packing, see also 4;9.1.5. The description required in 5;4.1.5.7.1 b) must include a description of these subsidiary risks (e.g. "Subsidiary risk: 3,6.1"), the name of the constituents which most predominantly contribute to this (these) subsidiary risk(s) and, where applicable, the packing group. . . .

Editorial Note.— Additional proposed amendments to Special Provisions A78, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

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Editorial Note.— Proposed amendments to Special Provisions A88, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

A91	(198)	A nitrocellulose solution containing not more than 20 per cent nitrocellulose may be transported under the requirements for "Paint", "Perfumery products" or "Printing ink" as applicable; see UN 1210, UN 1263, UN 1266, UN 3066, UN 3469 and UN 3470.

. . .

A97		These entries ~~may~~ must be used for substances which are hazardous to the environment but do not meet the classification criteria of any other class or other substance within Class 9. This must be based on the criteria as indicated in 2;9.2.1 a). This designation may also be used for wastes not otherwise subject to these Instructions but which are covered under the *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal*.

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Editorial Note.— Proposed amendments to Special Provisions A99, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

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Editorial Note.— Proposed amendment to Special Provisions A109, which relates to approvals and exemptions, is shown in Appendix B to the report on Agenda Item 5.

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A124	(292)	~~Mixtures containing not more than 23.5 per cent oxygen by volume may be transported under this entry when no other oxidizing gases are present. A Division 5.1 subsidiary risk label is not required for any concentrations within this limit.~~Not used.

TIs	*UN*	
. . .		
A130	(290)	When this radioactive material meets the definitions and criteria of other classes or divisions as defined in Part 2, it must be classified in accordance with the following: a) Where the substance meets the criteria for dangerous goods in excepted quantities as set out in 3;5, the packagings must be in accordance with 3;5.2 and meet the testing requirements of 3;5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1;6.1.5 apply without reference to the other class or division; b) Where the quantity exceeds the limits specified in 3;5.1.2, the substance must be classified in accordance with the predominant subsidiary risk. The dangerous goods transport document must describe the substance with ~~Such material must be declared under~~ the proper shipping name and UN number applicable to the other class supplemented with ~~appropriate for the material in that predominant Class or division, with the addition of~~ the name applicable to ~~this~~ the radioactive ~~material~~ excepted package according to column 1 of the Dangerous Goods List, and must be transported in accordance with the provisions applicable to that UN number. An example of the information shown on the dangerous goods transport document is: UN 1993 Flammable liquid, n.o.s. (ethanol and toluene mixture), Radioactive material, excepted package — limited quantity of material, Class 3, PG II The radioactive material, excepted package label (Figure 5-30) is not required on packages meeting the conditions set out in this sub-paragraph. To aid acceptance, it is recommended that "A130" be indicated on the dangerous goods transport document. In addition, ~~all other~~ the requirements ~~specified in~~ of ~~1;6.1.5~~ 2;7.2.4.1.1 ~~must~~ apply~~.~~; c) The provisions of 3;4 for the transport of dangerous goods packed in limited quantities do not apply to substances classified in accordance with sub-paragraph b); d) When the substance meets a special provision that excepts this substance from all dangerous goods provisions of the other classes, it must be classified in accordance with the applicable UN number of Class 7 and all requirements specified in 1;6.1.5 apply.

TIs	*UN*	
A131	(342)	~~Sterilization devices, when containing less than 30 mL per inner packaging with not more than 300 mL per outer packaging, may be transported on passenger and cargo aircraft in accordance with the provisions in 3;5, irrespective of the value in column 9 and the indication of "Forbidden" in columns 10 to 13 of the Dangerous Goods List (Table 3-1). In addition, after filling, each inner packaging must be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. Any inner packaging showing evidence of leakage, distortion or other defect under this test may not be transported under the terms of this special provision. In addition to the packaging required by 3;5, inner packagings must be placed in a sealed plastics bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the inner packaging. Glass inner packagings must be placed within a protective shield capable of preventing the glass from puncturing the plastics bag in the event of damage to the packaging (e.g. crushing).~~Glass inner receptacles (such as ampoules or capsules) intended only for use in sterilization devices, when containing less than 30 mL of ethylene oxide per inner packaging with not more than 300 mL per outer packaging, may be transported in accordance with the provisions in 3;5, irrespective of the indication of "E0" in column 9 of Table 3-1 provided that: a) after filling, each glass inner receptacle has been determined to be leak-tight by placing the glass inner receptacle in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. Any glass inner receptacle showing evidence of leakage, distortion or other defect under this test must not be transported under the terms of this special provision; b) in addition to the packaging required by 3;5.2, each glass inner receptacle is placed in a sealed plastic bag compatible with ethylene oxide and capable of containing the contents in the event of breakage or leakage of the glass inner receptacle; and c) each glass inner receptacle is protected by a means of preventing puncture of the plastic bag (e.g. sleeves or cushioning) in the event of damage to the packaging (e.g. by crushing).

. . .

A133	(311)	Substances must not be transported under this entry unless approved by the appropriate national authority on the basis of the results of appropriate tests according to Part I of the UN *Manual of Tests and Criteria*. Packaging must ensure that the percentage of diluent does not fall below that stated in the appropriate authority approval at any time during transport.
A134	(312)	Vehicles or machinery powered by a fuel cell engine must be consigned under the entries UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, or UN 3166 **Engine, fuel cell, flammable gas powered** or UN 3166 **Engine, fuel cell, flammable liquid powered** as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed. Other ~~V~~vehicles which contain an internal combustion engine must be consigned under the entries UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries or lithium batteries, transported with the battery(ies) installed.
A135	(313)	~~Substances and mixtures meeting the criteria for Class 8 must be labelled with a "Corrosive" subsidiary risk label.~~Not used.

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A144		Protective breathing equipment (PBE) containing a small chemical oxygen generator for use by aircrew members may be transported on passenger aircraft in accordance with Packing Instruction 523 subject to the following conditions: a) the PBE must be serviceable and contained in the manufacturer's original unopened inner packaging (i.e. vacuum sealed bag and protective container); b) the PBE may only be consigned by, or on behalf of, an operator in the event that a PBE(s) has been rendered unserviceable or has been used and there is a need to replace such items so as to restore

TIs	*UN*	
		the number of PBEs on an aircraft to that required by pertinent airworthiness requirements and operating regulations;
		c) a maximum of two PBE may be contained in a package;
		d) the statement "Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144" must be:
		(i) included on the dangerous goods transport document;
		(ii) marked adjacent to the proper shipping name on the package.
		If the above conditions are met, the requirements of Special Provision A1 do not apply. All other requirements applicable to chemical oxygen generators must apply except that the "cargo aircraft only" handling label must not be displayed.
. . .		
A147	(329)	~~Where substances have a flash point of 60°C or less, the package(s) must bear a "FLAMMABLE LIQUID" subsidiary risk label in addition to the hazard label(s) required by these Instructions.~~Not used.
. . .		
A152		Insulated packagings conforming to the requirements of Packing Instruction 202 containing refrigerated liquid nitrogen fully absorbed in a porous material ~~and intended for transport, at low temperature, of non-dangerous products~~ are not subject to these Instructions provided the design of the insulated packaging would not allow the build-up of pressure within the container and would not permit the release of any refrigerated liquid nitrogen irrespective of the orientation of the insulated packaging and any outer packaging or overpack used is closed in a way that will not allow the build-up of pressure within that packaging or overpack. When used to contain substances not subject to these Instructions, ~~T~~the words "not restricted" and the special provision number A152 must be provided on the air waybill when an air waybill is issued.
. . .		
A165	(347)	~~This entry must not be used for transport on passenger aircraft when testing in accordance with the UN *Manual of Tests and Criteria* Test Series 6 (a), upon which classification was based, has shown evidence of a hazardous effect outside the package. This includes denting or perforation of the witness plate beneath the package. From 1 January 2010, for transport aboard passenger aircraft,~~ T~~t~~his entry may only be used if the results of Test Series 6 (d) of Part I of the UN *Manual of Tests and Criteria* have demonstrated that any hazardous effects arising from functioning are confined within the package (see 2;1.4.2.1). ~~*Note. — If the 6 (d) test is successfully completed before 1 January 2010, this entry may be used for transport on passenger aircraft.*~~
A166	(343)	This entry applies to crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard. The packing group assigned must be determined by the flammability hazard and inhalation hazard, in accordance with the degree of danger presented.
A167	(344)	The provisions of 6;5.4 must be met.
A168		Not used.

Editorial Note.— Text from new UN SP348 ("Batteries manufactured after 31 December 2011 must be marked with the Watt hour rating on the outside case") has been added to Section I of Packing Instructions 965, 966 and 967 (lithium ion battery packing instructions).

A169	(349)	Mixtures of a hypochlorite with an ammonium salt are not to be accepted for transport. UN No. 1791 **Hypochlorite solution** is a substance of Class 8.
A170	(350)	Ammonium bromate and its aqueous solutions and mixtures of a bromate with an ammonium salt are forbidden for transport.

TIs	*UN*	
A171	(351)	Ammonium chlorate and its aqueous solutions and mixtures of a chlorate with an ammonium salt are forbidden for transport.
A172	(352)	Ammonium chlorite and its aqueous solutions and mixtures of a chlorite with an ammonium salt are forbidden for transport.
A173	(353)	Ammonium permanganate and its aqueous solutions and mixtures of a permanganate with an ammonium salt are forbidden for transport.
A174	(354)	This substance is toxic by inhalation.
A175	(355)	Oxygen cylinders for emergency use transported under this entry may include installed actuating cartridges (cartridges, power device of Division 1.4, Compatibility Group C or S), without changing the classification of Division 2.2 provided the total quantity of deflagrating (propellant) explosives does not exceed 3.2 g per oxygen cylinder. The cylinders with the installed actuating cartridges as prepared for transport must have an effective means of preventing inadvertent activation.
A176	(356)	Metal hydride storage system(s) installed in conveyances or in completed conveyance components or intended to be installed in conveyances must be approved by the appropriate national authority before acceptance for transport. The dangerous goods transport document must include an indication that the package was approved by the appropriate national authority or a copy of the appropriate national authority approval must accompany each consignment.
A177	(357)	Petroleum crude oil containing hydrogen sulphide in sufficient concentration that vapours evolved from the crude oil can present an inhalation hazard must be consigned under the entry UN 3494 **Petroleum sour crude oil, flammable, toxic.**
A178		Security type equipment such as attaché cases, cash boxes, cash bags, etc., incorporating dangerous goods, for example lithium batteries, gas cartridges and/or pyrotechnic material, are not subject to these Instructions if the equipment complies with the following: a) The equipment must be equipped with an effective means of preventing accidental activation; b) If the equipment contains an explosive or pyrotechnic substance or an explosive article, this article or substance must be excluded from Class 1 by the appropriate national authority of the State of Manufacture in compliance with Part 2;1.5.2.1; c) If the equipment contains lithium cells or batteries, these cells or batteries must comply with the following restrictions: 1) for a lithium metal cell, the lithium content is not more than 1 g; 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g; 3) for lithium ion cells, the Watt-hour rating (see Attachment 2) is not more than 20 Wh; 4) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh; 5) each cell or battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, section 38.3; d) If the equipment contains gases to expel dye or ink, only gas cartridges and receptacles, small, containing gas with a capacity not exceeding 50 mL, containing no constituents subject to these Instructions other than a Division 2.2 gas, are allowed. The release of gas must not cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties. In case of accidental activation all hazardous effects must be confined within the equipment and must not produce extreme noise. e) Security type equipment that is defective or that has been damaged is forbidden for transport. The words “not restricted” and the special provision number A178 must be provided on the air waybill when an air waybill is issued.
A179		For UN 3077, irrespective of the maximum net quantities specified in columns 11 and 13 of Table 3-1, intermediate bulk containers (IBCs) with a maximum net quantity not exceeding 1 000 kg are permitted in accordance with Packing Instruction 956.

TIs	*UN*	
A180		Non-infectious specimens, such as specimens of mammals, birds, amphibians, reptiles, fish, insects and other invertebrates containing small quantities of UN 1170, UN 1198, UN 1987 or UN 1219 are not subject to these Instructions provided the following packing and marking requirements are met: a) specimens are: 1) wrapped in paper towel and/or cheesecloth moistened with alcohol or an alcohol solution and then placed plastic bag that is heat-sealed. Any free liquid in the bag must not exceed 30 mL; or 2) placed in vials or other rigid containers with no more than 30 mL of alcohol or an alcohol solution; b) the prepared specimens are then placed in a plastic bag that is then heat–sealed; c) the bagged specimens are then placed inside a another plastic bag with absorbent material then heat sealed; d) the finished bag is then placed in a strong outer packaging with suitable cushioning material; e) the total quantity of flammable liquid per outer packaging must not exceed 1 L; and f) the completed package is marked "scientific research specimens, not restricted Special Provision A180 applies". The words "not restricted" and the special provision number A180 must be provided on the air waybill when an air waybill is issued.

Editorial Note.— New Special Provisions A181, 182 and 13, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

Chapter 4

DANGEROUS GOODS IN LIMITED QUANTITIES

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Note.— The UN Recommendations contain provisions for limited quantities of dangerous goods. These recognize that many dangerous goods when in reasonably limited quantities present a reduced hazard during transport and can safely be carried in good quality packagings of the types specified in the Recommendations but which have not been tested and marked accordingly. The provisions contained in this paragraph are based on those in the UN Recommendations and allow limited quantities of dangerous goods to be transported in packagings which, although not tested and marked in accordance with Part 6 of these Instructions, do meet the construction requirements of that part. The UN Recommendations require packages containing limited quantities of dangerous goods to be marked with a diamond shaped mark as specified in Chapter 3.4 of the UN Model Regulations. The mark required by these Instructions includes all of the elements of this mark with the addition of a "Y" which indicates compliance with the provisions of these Instructions, some of which are more stringent than those of the UN Model Regulations and of other modes of transport. For example, packages transported in accordance with these Instructions require hazard labels, and inner package and per-package quantities are in some cases lower than those authorized by the UN Model Regulations. The UN Model Regulations recognize the mark required by these Instructions in order to ensure that packages containing limited quantities of dangerous goods prepared in accordance with these Instructions are acceptable for transport by other modes.

. . .

4.2 PACKING AND PACKAGINGS

4.2.1 The general packing requirements of 4;1.1 applicable to passenger aircraft must be met except that the requirements of 4;1.1.2, 4;1.1.8 c), 4;1.1.8 e) ~~and~~ 4;1.1.16, 4;1.1.18 and 4;1.1.20 do not apply.

. . .

4.5 PACKAGE MARKING

4.5.1 Packages containing limited quantities of dangerous goods must be marked as required by the applicable paragraphs of 5;2, except that 5;2.4.4.1 does not apply.

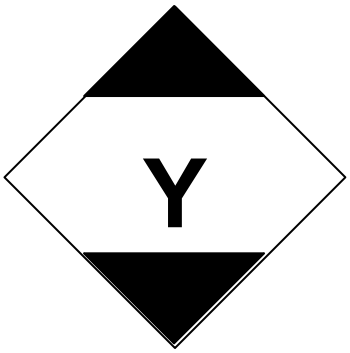
4.5.2 Packages containing limited quantities of dangerous goods and prepared in accordance with this chapter must ~~be marked "limited quantity(ies)" or "LTD QTY".~~ bear the marking shown in Figure 3-1 below. The marking must be readily visible, legible and able to withstand open weather exposure without a substantial reduction in effectiveness.

4.5.3 When packages containing dangerous goods in limited quantities are placed in an overpack, the overpack must be marked with the word "OVERPACK" and the marking required by this chapter unless the markings representative of all dangerous goods in the overpack are visible.

~~4.6 DANGEROUS GOODS TRANSPORT DOCUMENT~~

~~The dangerous goods transport document required by 5;4.1 must contain the words "limited quantity" or "LTD QTY" to indicate that the consignment contains limited quantities of dangerous goods.~~

Insert new Figure 3-1:



Top and bottom portions and line must be black, centre area white or suitable contrasting background
The symbol "Y" must be placed in the centre of the mark and must be clearly visible

Minimum dimension: 100 mm × 100 mm
Minimum width of line forming diamond: 2 mm
If the size of the package so requires, the dimension may be reduced, to be not less than 50 mm × 50 mm provided the marking remains clearly visible

Figure 3-1. Limited quantities mark

Chapter 5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

. . .

5.1 EXCEPTED QUANTITIES

5.1.1 Excepted quantities of dangerous goods of certain classes, other than articles, meeting the provisions of this chapter are not subject to any other provisions of these Instructions except for:

a) the prohibition in post in 1;2.3;

b) the definitions in 1;3;

~~a~~c) the training requirements in 1;4;

~~b~~d) the classification procedures and packing group criteria in Part 2; ~~and~~

~~c~~e) the packaging requirements of 4;1.1.1, 4;1.1.3.1, 4;1.1.5, 4;1.1.6 and 4;1.1.7 (4;1.1.6 does not apply to UN 3082)~~.~~;

f) the loading restriction in 7;2.1; and

g) the reporting requirements of dangerous goods accidents, incidents and other occurrences in 7;4.4 and 7;4.5.

Note.— In the case of radioactive material, the requirements for radioactive material in excepted packages in 1;6.1.5 apply.

. . .

5.2 PACKAGINGS

5.2.1 Packagings used for the transport of dangerous goods in excepted quantities must be in compliance with the following:

. . .

f) overpacks may be used and may also contain packages of dangerous goods or goods not subject to these Instructions provided that the packages are secured within the overpack.

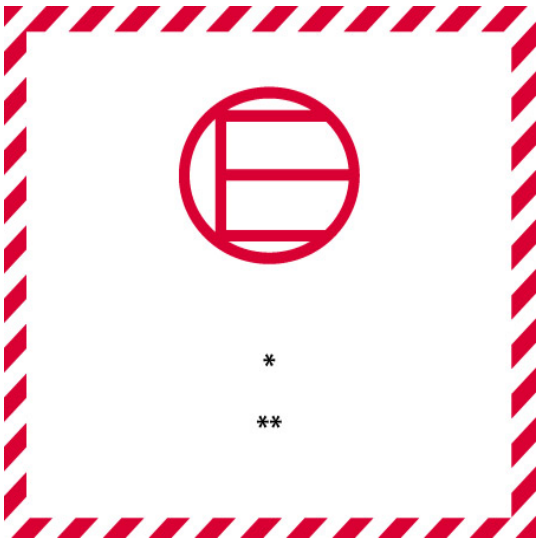
. . .

5.4 MARKING OF PACKAGES

5.4.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this chapter must be durably and legibly marked with the mark shown in Figure 3-~~1~~2. The primary hazard class or, when assigned, the division of each of the dangerous goods contained in the package must be shown in the mark. Where the name of the shipper or consignee is not shown elsewhere on the package, this information must be included within the mark.

. . .

Change dimension of Excepted quantities mark as follows (2.76″ x 2.76″):



Hatching and symbol of the same colour, black or red, on white or suitable contrasting background

* Place for class or, when assigned, the division number(s)

** Place for name of shipper or consignee, if not shown elsewhere on the package

Figure 3-~~1~~2. Excepted quantities mark

Part 4

PACKING INSTRUCTIONS

INTRODUCTORY NOTES

. . .

Note 3.— Pressure variations

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

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Editorial Note.— Proposed amendments to Note 6, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

Chapter 1

GENERAL PACKING REQUIREMENTS

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1.1 GENERAL REQUIREMENTS APPLICABLE TO ALL CLASSES EXCEPT CLASS 7

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1.1.3 Compatibility requirements

1.1.3.1 Parts of packagings which are in direct contact with dangerous goods:

a) must not be affected or significantly weakened by those dangerous goods;~~ and~~

b) must not cause a dangerous effect, e.g. catalyzing a reaction or reacting with the dangerous goods; and~~.~~

c) must not allow permeation of the dangerous goods that could constitute a danger under normal conditions of transport.

Where necessary, they must be provided with a suitable inner coating or treatment.

1.1.3.2 Shippers must also ensure that any absorbent materials and the materials of intermediate packagings for liquids do not react dangerously with the liquid.

1.1.3~~.2~~3 Materials, such as some plastics, which can be significantly softened or rendered brittle or permeable by the temperatures likely to be experienced during transport or because of the chemical action of the contents or the use of a refrigerant, must not be used. Even though certain packagings are specified in individual packing instructions, it is, nevertheless, the responsibility of the shipper to ensure that such packagings are, in every way, compatible with the articles

or substances to be contained within such packagings. This particularly applies to corrosivity, permeability, softening, premature aging and embrittlement.

Particular attention should be paid to the following:

a) the effect of fluorine on glass;

b) the effects of corrosion on metals such as steel and aluminium; and

c) consideration of the interaction (such as swelling, permeation, chemical degradation and environmental stress cracking) of substances with polymer materials such as polyethylene and polypropylene.

1.1.3 ~~3~~4 Shippers must ensure that all appropriate measures have been taken to ensure that the packagings used are compatible with the dangerous goods to be transported. Evidence of such measures or assessments must be made available to the competent authority upon request.

. . .

1.1.4 The body and the closure of any packaging must be so constructed as to be able to adequately ~~to~~ resist the effects of temperature and vibration occurring in normal conditions of transport. ~~Stoppers, corks or other such friction-type closures must be held securely, tightly and effectively in place by positive means (for example, by the use of adhesive tape, friction sleeves, welding or soldering, positive locking wires).~~ The closure device must be so designed that it:

a) is unlikely that it can be incorrectly or incompletely closed, and must be such that it may be checked easily to determine that it is completely closed ~~.~~; and

b) remains securely closed during transport.

1.1.4.1 In addition, for liquid substances, closures must be held securely, tightly and effectively in place by secondary means. Examples of such methods include: adhesive tape, friction sleeves, welding or soldering, positive locking wires, locking rings, induction heat seals and child-resistant closures. The closure device must be so designed that it is unlikely that it can be incorrectly or incompletely closed. When secondary means of closure cannot be applied to an inner packaging containing liquids, the inner packaging must be securely closed and placed in a leakproof liner and then placed in an outer packaging.

. . .

~~1.1.10 Unless otherwise provided in the packing instructions, liquids in Class 3, 4 or 8, or Division 5.1, 5.2 or 6.1 that are packaged in glass, earthenware, plastic or metal inner packagings must be packaged using absorbent material as follows:~~

~~a) Packing Group I liquids on passenger aircraft must be packaged using material capable of absorbing the entire contents of the inner packagings containing such liquids;~~

~~b) Packing Group I liquids on cargo aircraft and Packing Group II liquids and liquids in Division 5.2 on passenger and cargo aircraft must be packaged using a sufficient quantity of absorbent material to absorb the entire contents of any one of the inner packagings containing such liquids and, where they are of different sizes and quantities, sufficient absorbent material to absorb the contents of the inner packaging with the greatest quantity.~~

~~1.1.10.1 Absorbent material is not required if the inner packagings are so protected that breakage of them and leakage of their contents from the outer packaging will not occur during normal conditions of transport. Where absorbent material is required and an outer packaging is not liquid-tight, a means of containing the liquid in the event of a leakage must be provided in the form of a leakproof liner, plastic bag or other equally efficient means of containment.~~

~~1.1.10.2 Absorbent material must not react dangerously with the liquid.~~

. . .

1.1.13 Combination packagings containing liquid dangerous goods, excluding flammable liquids in inner packagings of 120 mL or less, or infectious substances in primary receptacles not exceeding 50 mL, or hermetically sealed inner packagings each containing not more than 500 mL, must be packed so that the closures on the inner packagings are upward and the upright position of the package must be indicated on it by the “Package orientation” label shown in 5;3.2.11 b). The words “This side up” or “This end up” may also be displayed on the top cover of the package.

. . .

1.1.20 For plastic drums and jerricans, rigid plastic IBCs and composite IBCs with plastic inner receptacles, unless otherwise approved by the appropriate national authority, the period of use permitted for the transport of dangerous goods must be not more than five years from the date of manufacture of the receptacles, except where a shorter period of use is prescribed because of the nature of the substance to be transported.

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Editorial Note.— Proposed amendments to Chapter 2, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

Chapter 4

CLASS 2 — GASES

. . .

4.1.1.8 Valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage, which could cause inadvertent release of the contents of the cylinder and closed cryogenic receptacle, by one of the following methods:

a) Valves are placed inside the neck of the cylinder and closed cryogenic receptacle and protected by a threaded plug or cap;

b) Valves are protected by caps. Caps must possess vent holes of a sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;

c) Valves are protected by shrouds or guards;

d) Not used; or

e) Cylinders and closed cryogenic receptacles are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6;4.3 at the Packing Group I performance level.

For cylinders and closed cryogenic receptacles with valves as described in b) and c), the requirements of ISO 11117:1998 must be met; for valves with inherent protection, the requirements of Annex ~~B~~A of ISO 10297:~~1999~~2006 must be met. For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 must be met.

4.1.1.9 Non-refillable cylinders and closed cryogenic receptacles must:

a) be transported in an outer packaging, such as a box, or crate, or in shrink-wrapped trays or stretch-wrapped trays;

b) not used;

c) not be repaired after being put into service.

4.1.1.10 Refillable cylinders, other than closed cryogenic receptacles, must be periodically inspected according to the provisions of 6;5.1.6 and Packing Instruction 200 or 214. Cylinders and closed cryogenic receptacles must not be filled after they become due for periodic inspection but may be transported after the expiry of the time limit.

. . .

4.2 PACKING INSTRUCTIONS

200	PACKING INSTRUCTION 200	200
For cylinders, the general packing requirements of 1.1 and 4.1.1 must be met. . . .		

Editorial Note.— Moved from below. *Delete* ")" at left margin below:

~~5)~~4) Gas mixtures containing any of the following gases must not be offered for transport in aluminium alloy cylinders unless approved by the appropriate national authority of the State of Origin and the State of the Operator:

UN 1037 **Ethyl chloride**
UN 1063 **Methyl chloride**
UN 1063 **Refrigerant gas R 40**
UN 1085 **Vinyl bromide, stabilized**
UN 1086 **Vinyl chloride, stabilized**
UN 1860 **Vinyl fluoride, stabilized**
UN 1912 **Methyl chloride and methylene chloride mixture**

~~4~~5) Keys for the column "Special packing provisions":

Material compatibility

a) Aluminium alloy cylinders are forbidden.
b) Copper valves are forbidden.
c) Metal parts in contact with the contents must not contain more than 65 per cent copper.
d) When steel cylinders are used, only those bearing the "H" mark are permitted.

Gas specific provisions:

l) UN 1040 **Ethylene oxide** may also be packed in hermetically sealed glass ampoules ~~(IP.8)~~ or metal inner packagings ~~(IP.3 and IP.3A)~~ suitably cushioned in fibreboard, wooden or metal boxes meeting the Packing Group I performance level. The maximum quantity permitted in any glass inner packaging is 30 g, and the maximum quantity permitted in any metal inner packaging is 200 g. After filling, each inner packaging must be determined to be leak-tight by placing the inner packaging in a hot water bath at a temperature, and for a period of time, sufficient to ensure that an internal pressure equal to the vapour pressure of ethylene oxide at 55°C is achieved. The maximum net mass in any outer packaging must not exceed 2.5 kg. When cylinders are used, they must be of the seamless or welded steel types that are equipped with suitable pressure relief devices. Each cylinder must be tested for leakage with an inert gas before each refilling and must be insulated with three coats of heat retardant paint or in any equally efficient manner. The maximum net quantity per cylinder must not exceed 25 kg.

m) Cylinders must be filled to a working pressure not exceeding 5 bar.

o) In no case must the working pressure or filling ratio shown in the table be exceeded.

p) For UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**: cylinders must be filled with a homogeneous monolithic porous mass; the working pressure and the quantity of acetylene must not exceed the values prescribed in the approval or in ISO 3807-1:2000 or ISO 3807-2:2000, as applicable.

For UN 1001 **Acetylene, dissolved**, cylinders must contain a quantity of acetone or suitable solvent as specified in the approval (see ISO 3807-1:2000 or ISO 3807-2:2000, as applicable); cylinders fitted with pressure relief devices must be transported vertically.

The test pressure of 52 bar applies only to cylinders conforming to ISO 3807-2:2000.

Editorial Note.— Move "w" after "p" and re-letter it "ra)":

~~w~~ra) Ethyl chloride may be carried in securely sealed glass ampoules ~~(IP.8)~~ containing not more than 5 g of ethyl chloride with a ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons with not more than 12 ampoules per carton. The cartons must be tightly packed to prevent movement in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) that meet the performance testing requirements of 6;4 at the Packing Group II performance level. Not more than 300 g of ethyl chloride is permitted per package.

. . .

Table 2. LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
. . .									
≠ 1037	**Ethyl chloride**	2.1			X	10	10	0.80	a, ~~w~~ ra
. . .									

202 PACKING INSTRUCTION 202 202

This instruction applies to Class 2 refrigerated liquefied gases in open and closed cryogenic receptacles.

Requirements for closed cryogenic receptacles have been moved from the bottom of Packing Instruction 202.

**Requirements for ~~C~~c*losed cryogenic receptacles*

1) ~~For closed cryogenic receptacles, t~~The general requirements of 4;1 and 4;4.1 must be met.

2) The requirements of 6;5 must be met.

~~Closed cryogenic receptacles constructed as specified in 6;5 are authorized for the transport of refrigerated liquefied gases.~~

3) The closed cryogenic receptacles must be so insulated that they do not become coated with frost.

~~Air, argon, carbon dioxide, helium, krypton, neon, nitrogen, nitrous oxide, oxygen, trifluoromethane and xenon refrigerated liquids may be carried to the extent permitted in these Instructions and in packagings meeting the requirements as set. These requirements also apply to empty packagings unless all parts are at ambient temperatures.~~

~~1~~4) Test pressure

Refrigerated liquids must be filled in closed cryogenic receptacles with the following minimum test pressures:

a) For closed cryogenic receptacles with vacuum insulation, the test pressure must not be less than 1.3 times the sum of the maximum internal pressure of the filled receptacle, including during filling and discharge, plus 100 kPa (1 bar);

b) For other closed cryogenic receptacles, the test pressure must be not less than 1.3 times the maximum internal pressure of the filled receptacle, taking into account the pressure developed during filling and discharge.

~~2~~5) Degree of filling

For non-flammable, non-toxic refrigerated liquefied gases, the volume of liquid phase at the filling temperature and at a pressure of 100 kPa (1 bar) must not exceed 98 per cent of the water capacity of the pressure receptacle.

~~3~~6) Pressure-relief devices

Every closed cryogenic receptacle, having a nominal capacity in excess of 550 L, must be provided with at least 2 pressure-relief devices. The pressure-relief device must be of the type that will resist dynamic forces including surge.

Closed cryogenic receptacles, having a nominal capacity of 550 L or less, must be provided with at least 1 pressure-relief device, and may in addition have a frangible disc in parallel with the spring loaded device in order to meet the requirements of 6;5.1.3.6.5. The pressure-relief device must be of the type that will resist dynamic forces including surge.

Note.— The pressure-relief devices must meet the requirements of 6;5.1.3.6.4 and 6;5.1.3.6.5.

47) Compatibility

Materials used to ensure the leakproofness of the joints or for the maintenance of the closures must be compatible with the contents. In the case of receptacles intended for the transport of oxidizing gases (i.e. with a subsidiary risk of 5.1), these materials must not react with these gases in a dangerous manner.

Note.— Insulated packagings containing refrigerated liquid nitrogen fully absorbed in a porous material ~~and intended for transport, at low temperature, of non-dangerous products~~ are not subject to these Instructions provided they meet the requirements of Special Provision A152 ~~the design of the insulated packaging would not allow the build-up of pressure within the container and would not permit the release of any refrigerated liquid nitrogen irrespective of the orientation of the insulated packaging~~.

Requirements for open cryogenic receptacles

Open cryogenic receptacles must be constructed to meet the following requirements:

1. The receptacles must be designed, manufactured, tested and equipped in such a way as to withstand all conditions, including fatigue, to which they will be subjected during their normal use and during normal conditions of transport.

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

3. The receptacle must have a double wall construction with the space between the inner and outer wall being evacuated (vacuum insulation). The insulation must prevent the formation of hoar frost on the exterior of the receptacle.

4. The materials of construction must have suitable mechanical properties at the service temperature.

5. Materials which are in direct contact with the dangerous goods must not be affected or weakened by the dangerous goods intended to be transported and must not cause a dangerous effect, e.g. catalysing a reaction or reacting with the dangerous goods.

~~7~~6. ~~The glass vessel or flask must be protected by shock-absorbent material or structure and placed in a strong outer packaging that permits the release of the gas. The package must be designed so that the upright position of the glass vessel or flask is guaranteed under normal conditions of transport. Packagings must conform to the requirements of 6;3.1 and meet Packing Group II performance test requirements in accordance with 6;4 and be marked in compliance with 6;2.~~ Receptacles of glass double wall construction must have an outer packaging with suitable cushioning or absorbent materials which withstand the pressures and impacts liable to occur under normal conditions of transport.

67. The ~~open~~ receptacle must ~~have a secure base and must~~ be designed ~~so that it will~~ to remain ~~stable~~ in an upright position ~~and will not topple under normal conditions of~~ during transport (e.g. have a base whose smaller horizontal dimension is greater than the height of the centre of gravity when filled to capacity or be mounted on gimbals).

~~1~~8. ~~Open cryogenic r~~Receptacles must be metal or glass vacuum insulated vessels or flasks vented to the atmosphere to prevent any increase in pressure within the package and the openings must be ~~designed and constructed to permit the release of the gas~~ fitted with devices allowing gases to escape, preventing any splashing out of liquid and so configured that they remain in place during transport..

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

9. Open cryogenic receptacles must bear the following marks permanently affixed e.g. by stamping, engraving or etching:

— the manufacturer's name and address;
— the model number or name;
— the serial or batch number;
— the UN number and proper shipping name of gases for which the receptacle is intended;
— the capacity of the receptacle in litres.

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

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

~~8~~10. Open cryogenic receptacles are permitted for nitrogen, argon, krypton, neon and xenon refrigerated liquids.

. . .

Replace Packing Instruction 206 with the following:

Packing Instruction 206

Passenger and cargo aircraft for UN 3167, UN 3168 and UN 3169 only

General requirements

Part 4, Chapter 1 requirements must be met, including:

A gas sample may only be accepted for transport as a non-pressurized gas providing it is at a pressure corresponding to ambient atmospheric pressure at the time the containment system is closed and this must not exceed 105 kPa absolute.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS						
UN number and proper shipping name	*Inner packaging (see 6;3.2)*	*Inner packaging quantity (per receptacle) — passenger*	*Total quantity per package — passenger*	*Inner packaging quantity (per receptacle) — cargo*	*Total quantity per package — cargo*	**SINGLE PACKAGINGS**
UN 3167 **Gas sample, non-pressurized, flammable, n.o.s.**	Glass	1.0 L	1.0 L	2.5 L	5.0 L	No
	Metal	1.0 L		2.5 L		
UN 3168 **Gas sample, non-pressurized, toxic, flammable, n.o.s.**	Glass	Forbidden	Forbidden	1.0 L	1.0 L	No
	Metal			1.0 L		
UN 3169 **Gas sample, non-pressurized, toxic, n.o.s.**	Glass	Forbidden	Forbidden	1.0 L	1.0 L	No
	Metal			1.0 L		

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

— Inner packagings must be hermetically sealed.
— Packagings must meet the Packing Group II performance requirements.
— Inner packaging(s) must be packed so as to prevent movement in the outer packaging.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibreboard (1G)	Plastic (3H2)
Natural wood (4C2, 4C2)	Other metal (1N2)	Steel (3A2)
Plastic (4H1, 4H2)	Plastic (1H2)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

. . .

214 PACKING INSTRUCTION 214 214

This Instruction applies to storage systems containing hydrogen absorbed in a metal hydride (UN 3468) individually or when contained in equipment and apparatus when transported on cargo aircraft.

~~The storage systems must be constructed and marked by the manufacturer indicating they meet the requirements of Annex B of IEC PAS 62282-6-1.~~

~~Storage systems employing cylinders other than UN marked and certified cylinders may be used if the design, construction, testing, approval and markings conform to the requirements of the appropriate national authority of the State in which they are approved and filled.~~

~~Storage systems for which prescribed periodic tests have become due must not be filled and offered for transport until such retests have been successfully completed.~~

The following paragraph is moved to new paragraph 8):

~~Storage systems with a water capacity of less than 1 L must be packaged in rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use. They must be adequately secured or cushioned so as to prevent damage during normal conditions of transport.~~

~~Storage systems must be filled in accordance with procedures provided by the manufacturer of the system in accordance with clause B4.17.2 of IEC PAS 62282-6-1.~~

1) For metal hydride storage systems, the general packing requirements of 4;4.1 must be met.

2) Only cylinders not exceeding 150 L in water capacity and having a maximum developed pressure not exceeding 25 MPa are covered by this packing instruction.

3) Metal hydride storage systems meeting the applicable requirements of 6;5 for the construction and testing of cylinders containing gas may be used for the transport of hydrogen only.

4) When steel cylinders or composite cylinders with steel liners are used, only those bearing the “H” mark, in accordance with 6;5.2.9 j) are permitted.

5) Metal hydride storage systems must meet the service conditions, design criteria, rated capacity, type tests, batch tests, routine tests, test pressure, rated charging pressure and provisions for pressure relief devices for transportable metal hydride storage systems specified in ISO 16111:2008 and their conformity and approval must be assessed in accordance with 6;5.2.5.

6) Metal hydride storage systems must be filled with hydrogen at a pressure not exceeding the rated charging pressure shown in the permanent markings on the system as specified by ISO 16111:2008.

7) The periodic test requirements for a metal hydride storage system must be in accordance with ISO 16111:2008 and carried out in accordance with 6;5.2.6, and the interval between periodic inspections must not exceed five years.

8) Storage systems with a water capacity of less than 1 L must be packaged in rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use. They must be adequately secured or cushioned so as to prevent damage during normal conditions of transport.

. . .

PACKING INSTRUCTION Y215

Limited quantities for UN 3478 and 3479 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3478 **Fuel cell cartridges** containing liquefied flammable gas UN 3479 **Fuel cell cartridges** containing hydrogen in metal hydride	0.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges must not exceed 120 ml water capacity each.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Steel
Fibreboard	Fibreboard	Plastic
Natural wood	Plastic	Aluminium
Plastic	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

Chapter 5

CLASS 3 — FLAMMABLE LIQUIDS

5.1 PACKING INSTRUCTIONS

. . .

PACKING INSTRUCTION Y374

Limited quantities for UN 3473 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3473 **Fuel cell cartridges**, containing flammable liquids	2.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges must not exceed 0.5 L of flammable liquid fuel per cartridge.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Steel
Fibreboard	Fibreboard	Plastic
Natural wood	Plastic	Aluminium
Plastic	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

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Packing Instruction 377

Passenger and cargo aircraft for Chlorosilanes

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS						**SINGLE PACKAGINGS**	
UN number	*Inner packaging (see 6;3.2)*	*Net quantity per inner packaging — passenger*	*Net quantity per inner packaging — cargo*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1162, UN 1196, UN 1250, UN 1298, UN 1305, UN 2985	Glass	1.0 L	1.0 L	1.0 L	5.0 L	No	5.0 L
	Plastic	Forbidden	Forbidden				
	Steel	1.0 L	5.0 L				

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Plastic (1H2)
Plastic (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A2)
Reconstituted wood (4F)	
Steel (4A)	

SINGLE PACKAGINGS FOR CARGO AIRCRAFT ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
Plastic receptacle in steel drum (6HA1)	Steel (as permitted by 4;2.7)	Steel (1A1)	Steel (3A1)

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Chapter 6

CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

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Packing Instruction 459

Passenger and cargo aircraft — self-reactive substances

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— ~~Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary risk.~~

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OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
~~Aluminium (4B)~~	~~Aluminium (1B2)~~	~~Aluminium (3B2)~~
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Plastics (1H2)	~~Steel (3A2)~~
Plastics (4H1, 4H2)	Plywood (1D)	
Plywood (4D)	~~Steel (1A2)~~	
Reconstituted wood (4F)		
~~Steel (4A)~~		

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PACKING INSTRUCTION Y495

Limited quantities for UN 3476 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

Fuel cell cartridges containing liquid water reactive fuels are not permitted in limited quantities.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	Maximum quantity per package
UN 3476 **Fuel cell cartridges**, containing water-reactive substances	2.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges containing solid water reactive fuels must not exceed 0.2 kg solid water reactive fuel per cartridge.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Steel
Fibreboard	Fibreboard	Plastic
Natural wood	Plastic	Aluminium
Plastic	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

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Chapter 7

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

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Packing Instruction 570

Passenger and cargo aircraft

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— ~~Metal packagings must be corrosion resistant or be protected against corrosion for substances with a Class 8 subsidiary risk.~~

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OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
~~Aluminium (4B)~~	~~Aluminium (1B2)~~	~~Aluminium (3B2)~~
Fibreboard (4G)	Fibre (1G)	Plastics (3H2)
Natural wood (4C1, 4C2)	Other metal (1N2)	~~Steel (3A2)~~
Plastics (4H1, 4H2)	Plastics (1H2)	
Plywood (4D)	Plywood (1D)	
Reconstituted wood (4F)	~~Steel (1A2)~~	
~~Steel (1A)~~		

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Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

8.1 PACKING INSTRUCTIONS

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~~602~~620	PACKING INSTRUCTION ~~602~~620	~~602~~620

This packing instruction applies to UN 2814 and UN 2900.

The following packagings are authorized provided the special packing provisions are met.

Packagings meeting the requirements of 6;6 and approved accordingly consisting of:

a) inner packagings comprising:

1) leakproof primary receptacle(s);

2) a leakproof secondary packaging;

3) other than for solid infectious substances, an absorbent material in sufficient quantity to absorb the entire contents placed between the primary receptacle(s) and the secondary packaging; if multiple fragile primary receptacles are placed in a single secondary packaging, they ~~shall~~ must be either individually wrapped or separated so as to prevent contact between them;

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f) Other dangerous goods must not be packed in the same packaging as Division 6.2 infectious substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 ml or less of dangerous goods included in Class 3, 8 or 9 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3;5. These small quantities of dangerous goods of Class 3, 8 or 9 are not subject to any additional requirements of these Instructions when packed in accordance with this packing instruction.

~~f~~g) Alternative packagings for the transport of animal material may be authorized by the competent authority in accordance with the provisions of 4;2.8.

~~g) A quantity of 30 ml or less of dangerous goods included in Class 3, 8 or 9 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 3;5.~~

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622	PACKING INSTRUCTION 622	622

The general packing requirements of 4;1 except 1.1.20 must be met.

Consignments must be prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during transport.

Consignments must be packed in steel drums (1A2), aluminium drums (1B2), plywood drums (1D), fibre drums (1G), plastic drums (1H2), steel jerricans (3A2), plastic jerricans (3H2), wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F) or fibreboard boxes (4G). Packagings must meet Packing Group II requirements.

The packaging tests may be those appropriate for solids when there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids.

In all other circumstances, the packaging tests must be those appropriate for liquids.

Packagings intended to contain sharp objects such as broken glass and needles must be resistant to puncture and retain liquids under the performance test conditions for the packaging.

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Packing Instruction 681

Passenger and cargo aircraft for Chlorosilanes

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS						SINGLE PACKAGINGS	
UN number	*Inner packaging (see 6;3.2)*	*Net quantity per inner packaging — passenger*	*Net quantity per inner packaging — cargo*	*Total quantity per package — passenger*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 3361, UN 3362	Glass	1.0 L	1.0 L	1.0 L	30.0 L	No	30.0 L
	Plastic	Forbidden	Forbidden				
	Steel	1.0 L	5.0 L				

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Plastic (1H2)
Plastic (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A2)
Reconstituted wood (4F)	
Steel (4A)	

SINGLE PACKAGINGS FOR CARGO AIRCRAFT ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
Plastic receptacle in steel drum (6HA1)	Steel (as permitted by 4;2.7)	Steel (1A1)	Steel (3A1)

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Chapter 9

CLASS 7 — RADIOACTIVE MATERIAL

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9.1 GENERAL

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9.3 PACKAGES CONTAINING FISSILE MATERIAL

Unless not classified as fissile in accordance with 2;7.2.3.5, packages containing fissile material must not contain:

a) a mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) different from that authorized for the package design;

b) any radionuclide or fissile material different from those authorized for the package design; or

c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design;

as specified in their certificates of approval, where appropriate.

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Chapter 10

CLASS 8 — CORROSIVE SUBSTANCES

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PACKING INSTRUCTION Y873

Limited quantities for UN 3477 only

General requirements

Part 3;4 requirements must be met.

Single packagings are not permitted for limited quantities.

For the purpose of this packing instruction, a fuel cell cartridge is considered an inner packaging.

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

UN number and name	*Maximum quantity per package*
UN 3477 **Fuel cell cartridges**, containing corrosive substances	2.5 kg of fuel cell cartridges

ADDITIONAL PACKING REQUIREMENTS

— Fuel cell cartridges must be securely cushioned in the outer packagings.
— Fuel cell cartridges must not exceed 0.2 L of liquid corrosive fuel or 0.2 kg of solid corrosive fuel per cartridge.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes	*Drums*	*Jerricans*
Aluminium	Aluminium	Steel
Fibreboard	Fibreboard	Plastic
Natural wood	Plastic	Aluminium
Plastic	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

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Packing Instruction 876

Cargo aircraft only for Chlorosilanes

General requirements

Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.
— Metal packagings must be corrosion resistant or be protected against corrosion.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				**SINGLE PACKAGINGS**	
UN number	*Inner packaging (see 6;3.2)*	*Net quantity per inner packaging — cargo*	*Total quantity per package — cargo*	*Passenger*	*Cargo*
UN 1724, UN 1728, UN 1747, UN 1753, UN 1762, UN 1763, UN 1766, UN 1767, UN 1769, UN 1771, UN 1781, UN 1784, UN 1799, UN 1800, UN 1801, UN 1804, UN 1816, UN 1818, UN 2434, UN 2435, UN 2437, UN 2986, UN 2987	Glass	1.0 L	30.0 L	No	30.0 L
	Plastic	Forbidden			
	Steel	5.0 L			

OUTER PACKAGINGS OF COMBINATION PACKAGINGS

Boxes	*Drums*
Fibreboard (4G)	Fibre (1G)
Natural wood (4C1, 4C2)	Plastic (1H2)
Plastic (4H1, 4H2)	Plywood (1D)
Plywood (4D)	Steel (1A2)
Reconstituted wood (4F)	
Steel (4A)	

SINGLE PACKAGINGS FOR CARGO AIRCRAFT ONLY

Composites	*Cylinders*	*Drums*	*Jerricans*
Plastic receptacle in steel drum (6HA1)	Steel (as permitted by 4;2.7)	Steel (1A1)	Steel (3A1)

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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Packing Instruction 950

Passenger and cargo aircraft for UN 3166 only
(See Packing Instruction 951 for flammable gas-powered vehicles and engines or
Packing Instruction 952 for battery-powered equipment and vehicles)

Editorial Note.— Additional proposed amendments to this packing instruction, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

General requirements

Part 4, Chapter 1 requirements must be met, including:

~~1)~~ **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

~~2) **Closure requirements**~~

~~— Closures must meet the requirements of 4;1.1.4.~~

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3166 **Engines, internal combustion, flammable liquid powered** or **Vehicle, flammable liquid powered** **or Vehicle, fuel cell, flammable liquid powered or Engine, fuel cell, flammable liquid powered**	No limit	No limit

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Other operational equipment

1) Dangerous goods required for the operation of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters, safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.

2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Internal combustion or fuel cell engine shipped separately (not installed)

1) When internal combustion engines or fuel cell engines are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.

2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines or fuel cell engines which are being shipped in a dismantled state such that fuel lines have been disconnected.

Packing Instruction 951

Cargo aircraft only for UN 3166 only
(See Packing Instruction 950 for flammable liquid-powered vehicles and engines or Packing Instruction 952 for battery-powered equipment and vehicles)

Editorial Note.— Additional proposed amendments to this packing instruction, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

General requirements

Part 4, Chapter 1 requirements must be met, including:

~~1)~~ **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

~~2) **Closure requirements**~~

~~— Closures must meet the requirements of 4;1.1.4.~~

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 3166 **Engines, internal combustion, flammable gas powered** or **Vehicle, flammable gas powered or Vehicle, fuel cell, flammable gas powered, or Engine, fuel cell, flammable gas powered**	Forbidden	No limit

ADDITIONAL PACKING REQUIREMENTS ~~FOR COMBINATION PACKAGINGS~~

Flammable gas vessels

1) for flammable gas-powered vehicles, machines or equipment, pressurized vessels containing the flammable gas must be completely emptied of flammable gas. Lines from vessels to gas regulators, and gas regulators themselves, must also be drained of all trace of flammable gas. To ensure that these conditions are met, gas shut-off valves must be left open and connections of lines to gas regulators must be left disconnected upon delivery of the vehicle to the operator. Shut-off valves must be closed and lines reconnected at gas regulators before loading the vehicle aboard the aircraft;

or alternatively,

2) flammable gas-powered vehicles, machines or equipment that have pressure receptacles (fuel tanks) equipped with electrically operated valves that close automatically in case the power is disconnected, or with manual shut-off valves, may be transported under the following conditions:

   i) the tank shut-off valves must be in the closed position and in the case of electrically operated valves, power to those valves must be disconnected;

   ii) after closing the tank shut-off valves, the vehicle, equipment or machinery must be operated until it stops from lack of fuel before being loaded aboard the aircraft;

   iii) in no part of the closed system must the remaining pressure of compressed gases exceed 5 per cent of the maximum allowable working pressure of the pressure receptacle (fuel tank) system, or more than 2 000 kPa (20 bar), whichever is the lower.

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Other operational equipment

1) Dangerous goods required for the operation of the vehicle, machine or equipment, such as fire extinguishers, tire inflation canisters, safety devices, must be securely mounted in the vehicle, machine or equipment. Aircraft may also contain other articles and substances which would otherwise be classified as dangerous goods but which are installed in that aircraft in accordance with the pertinent airworthiness requirements and operating regulations. If fitted, life-rafts, emergency escape slides and other inflation devices must be protected such that they cannot be activated accidentally. Vehicles containing dangerous goods identified in Table 3-1 as forbidden on passenger aircraft may only be transported on cargo aircraft. Replacements for the dangerous goods permitted must not be carried under this packing instruction.

2) Vehicles equipped with theft-protection devices, installed radio communications equipment or navigational systems must have such devices, equipment or systems disabled.

Internal combustion or fuel cell engine shipped separately (not installed)

1) When internal combustion engines **or fuel cell engines** are being shipped separately, all fuel, coolant or hydraulic systems remaining in or on the engine must be drained as far as practicable and all disconnected fluid pipes must be sealed with leakproof caps, which are positively retained.

2) This requirement also applies to vehicles, machines or equipment containing internal combustion engines **or fuel cell engines** which are being shipped in a dismantled state such that fuel lines have been disconnected.

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Editorial Note.— Proposed amendments to Packing Instruction 952, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

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Packing Instruction 953

Passenger and cargo aircraft for UN 2807 only

~~**General requirements**~~

~~Part 4, Chapter 1 requirements must be met, including:~~

~~1) **Compatibility requirements**~~

~~— Substances must be compatible with their packagings as required by 4;1.1.3.~~

~~2) **Closure requirements**~~

~~— Closures must meet the requirements of 4;1.1.4.~~

UN number and proper shipping name	*Quantity — passenger*	*Quantity — cargo*
UN 2807 **Magnetized material**	No limit	No limit

~~**ADDITIONAL PACKING REQUIREMENTS**~~

~~Magnetized material will be accepted only when:~~

~~a) devices such as magnetrons and light meters have been packed so that the polarities of the individual units oppose one another;~~

~~b) permanent magnets, where possible, have keeper bars installed;~~

~~c) the magnetic field strength at a distance of 4.6 m from any point on the surface of the assembled consignment:~~

~~1) does not exceed 0.418 A/m; or~~

~~2) produces a magnetic compass deflection of 2 degrees or less.~~

~~Magnetized material may be shipped in a unit load device or other type of pallet prepared by a single shipper provided that the shipper has made prior arrangements with the operator. The shipper must provide the operator with written documentation stating the number of packages of magnetized material contained in each unit load device or other type of pallet.~~

~~*Note.— For loading restrictions, see 7;2.10.*~~

~~*Determination of shielding requirements*~~

~~The magnetic field strength of magnetized materials must be measured using measuring devices having a sensitivity sufficient to measure magnetic fields greater than 0.0398 A/m within a tolerance of plus or minus 5 per cent, or with a magnetic compass sensitive enough to read a 2 degree variation, preferably in 1-degree increments or finer. If the maximum field strength observed at a distance of 2.1 m is less than 0.159 A/m or there is no significant compass deflection (less than 0.5 degree), the article is not restricted as a magnetized material. Methods of determining if a magnetized article meets the definition of a magnetized material include:~~

~~a) When an oersted meter is used, it is placed on one of two points positioned 4.6 m apart and located in an area that is free from magnetic interference other than the earth's magnetic field. The oersted meter is then aligned with the second point and "balanced" to a zero reading. The magnetic article is then placed on the other point and the magnetic field strength is measured by reading the meter while rotating the package 360 degrees in its horizontal plane. If the maximum field strength observed is 0.418 A/m or less, the article is acceptable for air transport. When the maximum field strength exceeds 0.418 A/m, shielding should be applied until a reading of 0.418 A/m or less has been attained.~~

~~b) When a magnetic compass is used as a sensing device, it should be placed on one of two points positioned 4.6 m apart which are aligned in an East/West direction and in an area that is free from any magnetic interference other than the earth's magnetic field. The packaged item to be tested is placed on the other point and rotated 360 degrees in its horizontal plane for indication of compass deflection. When the maximum compass deflection observed is 2 degrees or less, the article is acceptable for air transport. When the maximum compass deflection of an item exceeds 2 degrees, shielding must be applied until the maximum deflection is not more than 2 degrees.~~

Magnetized materials with field strengths causing a compass deflection of more than 2 degrees at a distance of 2.1 m but not more than 2 degrees at a distance of 4.6 m (equivalent to 0.418 A/m or 0.00525 Gauss measured at a distance of 4.6 m) are not subject to any other requirements in these Instructions except for the following:

a) The shipper must make prior arrangements with the operator identifying the magnetized material. The dangerous goods transport document requirements of Part 5;4 are not applicable provided alternative written or electronic documentation includes the words "magnetized material" in association with the description of the goods;

b) The package must bear the magnetized material handling label;

c) The operator must stow the packaged magnetized material in accordance with 7;2.10; and

d) The incident reporting requirements of 7;4.4 must be met.

Magnetized material with field strength sufficient to cause a compass deflection of more than 2 degrees at a distance of 4.6 m may only be transported with the prior approval of the appropriate authority of the State of Origin and the State of the Operator.

Packing Instruction 954

Passenger and cargo aircraft for UN 1845 only

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ADDITIONAL PACKING REQUIREMENTS

In packages:

a) must be packed in accordance with the general packing requirements of 4;1 and be in packaging designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packaging;

b) the shipper must make arrangements with the operator(s) for each shipment, to ensure that ventilation safety procedures are followed;

c) the dangerous goods transport document requirements of 5;4 are not applicable provided alternative written documentation is provided describing the contents. Where an agreement exists with the operator, the shipper may provide the information by EDP or EDI techniques. The information required is as follows and should be shown in the following order:

1) UN 1845; ~~(~~

2) **Carbon dioxide, solid** or **Dry ice**~~) the word "Class" may be included prior to the number "9"~~;

~~2~~3) the number of packages and the net quantity of dry ice in each package;

d) the net mass of the **Carbon dioxide, solid** or **Dry ice** must be marked on the outside of the package; and

e) the information must be included with the description of the goods.

Dry ice used for other than dangerous goods may be shipped in a unit load device or other type of pallet prepared by a single shipper provided that:

a) the shipper has made prior arrangements with the operator;

b) the unit load device, or other type of pallet, must allow the venting of the carbon dioxide gas to prevent a dangerous build-up of pressure (the marking requirements of 5;2 and the labelling requirements of 5;3 do not apply to the unit load device); and

c) the shipper must provide the operator with written documentation or where agreed with the operator, information by EDP or EDI techniques, stating the total quantity of the dry ice contained in the unit load device or other type of pallet.

Packing Instruction 955

Passenger and cargo aircraft for UN 2990 and UN 3072 only

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ADDITIONAL PACKING REQUIREMENTS

The description "Life-saving appliances, self-inflating" (UN 2990) is intended to apply to life-saving appliances that present a hazard if the self-inflating device is activated accidentally.

Life-saving appliances, such as life rafts, life vests, aircraft survival kits or aircraft evacuation slides, may only contain the dangerous goods listed below:

a) Division 2.2 gases, must be contained in cylinders which conform to the requirements of the appropriate national authority of the country in which they are approved and filled. Such cylinders may be connected to the life-saving appliance. These cylinders may include installed actuating cartridges (cartridges, power

device of Division 1.4C and 1.4S) provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per unit. When the cylinders are shipped separately, they ~~shall~~ must be classified as appropriate for the Division 2.2 gas contained and need not be marked, labelled or described as explosive articles;

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Packing Instruction 956

Passenger and cargo aircraft for UN 1841, UN 1931, UN 3432, UN 2969, UN 3077, UN 3152 and UN 3335 only

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SINGLE PACKAGINGS

Bags	*Boxes*	*Composites*	*Cylinders*	*Drums*	*Jerricans*
Paper (5M2) Plastic film (5H4) Textile (5L3) Woven plastic (5H3)	Aluminium (4B) Fibreboard (4G) Natural wood (4C2) Plastic (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	All (see 6;3.1.18)	See 4;2.7	Aluminium (1B1, 1B2) Fibre (1G) Other metal (1N1, 1N2) Plastic (1H1, 1H2) Plywood (1D) Steel (1A1, 1A2)	Aluminium (3B1, 3B2) Plastic (3H1, 3H2) Steel (3A1, 3A2)

INTERMEDIATE BULK CONTAINERS FOR UN 3077 ONLY

For UN 3077, irrespective of the maximum net quantities specified in the columns 11 and 13 of the Dangerous Goods List (Table 3-1) and as provided above for single packagings, intermediate bulk containers (IBC) with a maximum net quantity not exceeding 1 000 kg are permitted as shown below. Each IBC must be in accordance with Chapter 6.5 of the United Nations Model Regulations and must bear the required UN mark.

Metal	*Rigid Plastic*	*Composite with plastic inner receptacle*	*Fibreboard*	*Wooden*	*Flexible*
Steel (11A), (21A) Aluminum (11B), (21B) Other than steel or aluminum (11N), (21N)	for solids, filled or discharged by gravity, fitted with structural equipment (11H1) for solids, filled or discharged by gravity, freestanding (11H2) for solids, filled or discharged under pressure, fitted with structural equipment (21H1) for solids, filled or discharged under pressure, freestanding (21H2)	for solids, filled or discharged by gravity, with rigid plastic inner receptacle (11HZ1) for solids, filled or discharged by gravity, with flexible plastic inner receptacle (11HZ2) for solids, filled or discharged under pressure, with rigid plastic inner receptacle (21HZ1) for solids, filled or discharged under pressure, with flexible plastic inner receptacle (21HZ2) (The IBC Code must be	for solids, filled or discharged by gravity (11G)	Natural wood for solids, filled or discharged by gravity with inner liner (11C) Plywood for solids, filled or discharged by gravity, with inner liner (11D) Reconstituted wood for solids, filled or discharged by gravity, with inner liner (11F)	Woven plastic, coated (13H2) Woven plastic with liner (13H3) Woven plastic, coated and with liner (13H4) Plastic film (13H5) Textile coated (13L2) Textile with liner (13L3) Textile coated and with liner (13L4) Paper multiwall (13M1) Paper multiwall, water resistant (13M2)

completed by replacing the letter Z with a capital letter indicating the nature of the material used for the outer casing (A for steel; B for aluminum; C for natural wood; D for plywood; F for reconstituted wood; G for fibreboard; H for plastic material; L for textile; M for paper, multiwalled; and N for metal other than steel or aluminium).)

ADDITIONAL PACKING REQUIREMENTS FOR INTERMEDIATE BULK CONTAINERS

— Flexible IBCs must be sift-proof and water resistant or must be fitted with a sift-proof and water resistant liner.

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Packing Instruction 959

Passenger and cargo aircraft for UN 3245 only

General requirements

Part 4, Chapter 1 and 2 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

The following packagings are authorized:

1) Packagings meeting the provisions of 4;1.1.1, 4;1.1.3.1, 4;1.1.5 and 4;2 and so designed that they meet the construction requirements of 6;3. Outer packagings constructed of suitable material of adequate strength and designed in relation to the packaging capacity and its intended use must be used. Where this packing instruction is used for the transport of inner packagings of combination packagings the packaging must be designed and constructed to prevent inadvertent discharge during normal conditions of transport.

2) Packagings, which need not conform to the packaging test requirements of Part 6, but conforming to the following:

a) an inner packaging comprising:

1) primary receptacle(s) and a secondary packaging, the primary receptacle(s) or the secondary packaging must be leakproof for liquids or siftproof for solids;

2) for liquids, absorbent material placed between the primary receptacle(s) and the secondary packaging. The absorbent material must be in a quantity sufficient to absorb the entire contents of the primary

receptacle(s) so that any release of the liquid substance will not compromise the integrity of the cushioning material or of the outer packaging;

3) if multiple fragile primary receptacles are placed in a single secondary packaging they must be individually wrapped or separated to prevent contact between them;

b) An outer packaging must be strong enough for its capacity, mass and intended use, and with a smallest external dimension of at least 100 mm.

For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm; the width of the line must be at least 2 mm and the letters and numbers must be at least 6 mm high.

Insert new figure:

~~*UN number and proper shipping name*~~	~~*State*~~	~~*Inner packaging (see 6;3.2)*~~	~~*Quantity — passenger*~~	~~*Quantity — cargo*~~	~~**SINGLE PACKAGINGS**~~
~~UN 3245 **Genetically modified organisms**~~	~~Liquid~~	~~100 mL~~	~~No limit~~	~~No limit~~	~~No~~
	~~Solid~~	~~100 g~~	~~No limit~~	~~No limit~~	

When packages are placed in an overpack, the package markings required by this packing instruction must either clearly be visible or the markings must be reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack”.

GMOs or GMMOs assigned to UN 3245 which are packed and marked in accordance with this packing instruction are not subject to any other requirement in these Instructions except for the following:

1) the name and address of the shipper and of the consignee must be provided on each package;
2) classification must be in accordance with 2;9.2.1 c);
3) the incident reporting requirements in 7;4.4 must be met;
4) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4;
5) passengers and crew members are prohibited from transporting UN 3245 either as, or in, carry-on baggage or checked baggage or on their person.

ADDITIONAL PACKING REQUIREMENTS

~~— The packaging must comply with all the requirements of Packing instruction 602.~~

— When dry ice or liquid nitrogen is used, all applicable requirements of these Instructions must be met. When used, ice or dry ice must be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports must be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met.

— The primary receptacle and the secondary packaging must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

Packing Instruction 960

Passenger and cargo aircraft for UN 3316 only

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ADDITIONAL PACKING REQUIREMENTS

— Kits may contain dangerous goods which require segregation according to Table 7-1. ~~The packing group assigned to the kit as a whole must be the most stringent packing group assigned to any individual substance contained in the kit.~~

— Kits must not be packed with other dangerous goods in the same outer packaging, with the exception of dry ice. If dry ice is used, the requirements in Packing Instruction 954 must be met.

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Packing Instruction 962

Passenger and cargo aircraft for UN 3363 only

General requirements

Part 4, Chapter 1 requirements must be met (except that the requirements of 4;1.1.2, 4;1.1.8, 4;1.1.10, 4;1.1.13 and 4;1.1.16 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

This entry only applies to apparatus or machinery containing dangerous goods as a residue or as an integral element of the machinery or apparatus. It must not be used for apparatus or machinery for which a proper shipping name exists in Table 3-1. For other than fuel system components, apparatus or machinery may only contain one or more of the following: dangerous goods permitted under 3;4.1.2~~,~~ or UN 2807 or ~~and~~ gases of Division 2.2 without subsidiary risk but excluding refrigerated liquefied gases.

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Y~~910~~963 PACKING INSTRUCTION Y~~910~~963 Y~~910~~963

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this packing instruction do not need to comply with 4;1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements.

a) Each packaging must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during air transport.

b) Inner packagings that are breakable (such as earthenware, glass or brittle plastic) must be packed to prevent breakage and leakage under conditions normally incident to transport. These completed packagings must be capable of withstanding a 1.2 m drop on solid concrete in the position most likely to cause damage. Each package offered for transport must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction of effectiveness, a force applied to the top surface for a duration of 24 hours equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample).

c) When filling receptacles for liquids, sufficient ullage (outage) must be left to ensure that neither leakage nor permanent distortion of the receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to prevail during transport. Unless specific requirements are prescribed in national rules or international agreements, liquids must not completely fill a receptacle at a temperature of 55°C. At this temperature a minimum ullage of 2 per cent should be left. The primary packaging (which may include composite packaging), for which retention of the liquid is a basic function, must be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than 75 kPa or a pressure related to the vapour pressure of the liquid to be conveyed, whichever is the greater. The pressure related to the vapour pressure must be determined by the method shown in 4;1.1.6. Tests on sample receptacles must be carried out to demonstrate the capability of the primary packaging to withstand the above pressure.

d) Stoppers, corks or other such friction-type closures must be held securely, tightly and effectively in place by positive means. The closure device must be so designed that it is extremely improbable that it can be incorrectly or incompletely closed and must be such that it may be easily checked to determine that it is completely closed.

e) Inner packagings must be tightly packed in strong outer packagings and must be so packed, secured or cushioned as to prevent any breakage, puncture or leakage of contents into the outer packaging(s) during normal conditions of transport. Absorbent material must be provided for glass or earthenware inner packaging(s) containing consumer commodities in Class 2 or 3 or liquids of Division 6.1, in sufficient quantity to absorb the liquid contents of the largest of such inner packagings contained in the outer packaging. Absorbent and cushioning material must not react dangerously with the contents of the inner packagings. Notwithstanding the above, absorbent material may not be required if the inner packagings are so protected that breakage of the inner packagings and leakage of their contents from the outer packaging will not occur during normal conditions of transport.

f) Inner packagings containing liquids, excluding flammable liquids in inner packagings of 120 mL or less, must be packed with their closures upward and the upright position of the package must be indicated by “Package orientation” labels (Figure 5-26). These labels, or pre-printed package orientation labels meeting the same specification as either Figure 5-26 or ISO Standard 780-1997, must be affixed to, or printed on, at least two opposite vertical sides of the package with the arrows pointing in the correct direction.

g) Each completed package as prepared for shipment must not exceed a gross mass of 30 kg G.

h) Class 2 substances must be further limited to aerosol products containing non-toxic compressed or liquefied gas(es) that are necessary to expel liquids, powders or pastes, packed in inner non-refillable non-metal receptacles not exceeding 120 mL capacity each, or in inner non-refillable metal receptacles not exceeding 820 mL capacity each (except that flammable aerosols must not exceed 500 mL capacity each), subject in either case to the following provisions:

   1) the pressure in the aerosol must not exceed 1 500 kPa at 55°C and each receptacle must be capable of withstanding without bursting a pressure of at least 1.5 times the equilibrium pressure of the contents at 55°C;

   2) if the pressure in the aerosol exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an inner IP.7, IP.7A or IP.7B metal receptacle must be used;

   3) if the pressure in the aerosol exceeds 1 105 kPa at 55°C but does not exceed 1 245 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;

   4) if the pressure in the aerosol exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;

   5) IP.7B metal receptacles having a minimum burst pressure of 1 800 kPa may be equipped with an inner capsule charged with a non-flammable, non-toxic compressed gas to provide the propellant function. In this case, the pressures indicated in 1), 2), 3) or 4) do not apply to the pressure within the capsule. The quantity of gas contained in the capsule must be so limited such that the minimum burst pressure of the receptacle would not be exceeded if the entire gas content of the capsule were released into an aerosol;

   6) the liquid contents must not completely fill the closed receptacle at 55°C;

   7) each aerosol exceeding 120 mL capacity must have been heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect; and

   8) the valves must be protected by a cap or other suitable means during transport.

i) For aerosols containing a biological or medical preparation which will be deteriorated by a heat test and which are non-toxic and non-flammable, packed in inner non-refillable receptacles not exceeding 575 mL capacity each, the following provisions are applicable:

   1) the pressure in the aerosol must not exceed 970 kPa at 55°C;

2) the liquid contents must not completely fill the closed receptacle at 55°C;

3) one aerosol out of each lot of 500 or less must be heated until the pressure in the aerosol is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect; and

4) the valves must be protected by a cap or other suitable means during transport.

j) Except for aerosols, inner packagings must not exceed:

1) 500 mL for liquids; and

2) 500 g for solids.

k) Consumer commodities shipped according to these provisions may be shipped in a unit load device or other type of pallet prepared by a single shipper provided they contain no other dangerous goods. The shipper must provide the operator with written documentation stating the number of packages of consumer commodities contained in each unit load device or other type of pallet.

l) The gross mass on the dangerous goods transport document must be shown as:

1) for one package, the actual gross mass of the package;

2) for more than one package, either the actual gross mass of each package or as the average mass of the packages. (For example, if there are 10 packages and the total gross mass of them is 100 kg, the dangerous goods transport document may show this as “average gross mass per package 10 kg”.)

m) Packages prepared in accordance with these provisions must be durably and legibly marked with the mark shown in Figure 3-1.

Packing Instruction 964

Passenger and cargo aircraft for UN 1941, UN 1990, UN 2315, UN 3151, UN 3082 and UN 3334 only

General requirements

Except for UN 3082 when the requirements of 4;1.1.6 do not apply, Part 4, Chapter 1 requirements must be met, including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

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Packing Instruction Y964

Limited quantities
Passenger and cargo aircraft for UN 1941, UN 1990 and UN 3082 only

General requirements

Except for UN 3082 when the requirements of 4;1.1.6 do not apply, Part 4, Chapter 1 requirements must be met (except that 4;1.1.2, 1.1.8 c), 1.1.8 e) and 1.1.16 do not apply), including:

1) **Compatibility requirements**

— Substances must be compatible with their packagings as required by 4;1.1.3.

2) **Closure requirements**

— Closures must meet the requirements of 4;1.1.4.

3) **Limited quantity requirements**

— Part 3, Chapter 4 requirements must be met including:

— the capability of the package to pass a 1.2 m drop test;
— a 24-hour stacking test; and
— inner packagings for liquids must be capable of passing a pressure differential test (4;1.1.6).

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Editorial Note.— Proposed amendments to the lithium battery packing instructions (Packing Instructions 965 to 970) are shown in Appendix D to the report on Agenda Item 5.

Part 5

SHIPPER'S RESPONSIBILITIES

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Chapter 1

GENERAL

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1.1 GENERAL REQUIREMENTS

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f) the overpack does not contain packages of dangerous goods which require segregation according to Table 7-1;

g) when an overpack is used, packages must be secured within the overpack;

~~g~~ h) the dangerous goods are not included in any freight container/unit load device except for radioactive material as specified in 7;2.9 (subject to the approval of the operator, this does not apply to a unit load device containing consumer commodities prepared according to Packing Instruction 910 or dry ice used as a refrigerant for other than dangerous goods when prepared according to Packing Instruction 904 or magnetized material when prepared according to Packing Instruction 902);

i) before a package or overpack is reused, all inappropriate dangerous goods labels and markings are removed or completely obliterated; and

j) each package contained within an overpack is properly packed, marked, labelled and is free of any indication that its integrity has been compromised and in all respects is properly prepared as required in these Instructions. The "overpack" marking described in 2.4.10 is an indication of compliance with this requirement. The intended function of each package must not be impaired by the overpack.

Note.— For cooling purposes, an overpack may contain dry ice, provided that the overpack meets the requirements of Packing Instruction 904.

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1.2 GENERAL PROVISIONS FOR CLASS 7

1.2.1 APPROVAL OF SHIPMENTS AND NOTIFICATION

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1.2.1.4 *Notifications*

Notification to competent authorities is required as follows:

a) Before the first shipment of any package requiring competent authority approval, the shipper must ensure that copies of each applicable competent authority certificate applying to that package design have been submitted to the competent authority of the country of origin of the shipment and to competent authority of each country through or into which the consignment is to be transported. The shipper is not required to await an acknowledgement from the competent authority, nor is the competent authority required to make such acknowledgement of receipt of the certificate;

b) For each of the following types of shipments:

i) Type C packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

ii) Type B(U) packages containing radioactive material with an activity greater than 3000 A_1 or 3000 A_2, as appropriate, or 1000 TBq, whichever is the lower;

iii) Type B(M) packages;

iv) Shipment under special arrangement;

the shipper must notify the competent authority of the country of origin of the shipment and the competent authority of each country through or into which the consignment is to be transported. This notification must be in the hands of each competent authority prior to the commencement of the shipment, and preferably at least 7 days in advance;

c) The shipper is not required to send a separate notification if the required information has been included in the application for shipment approval;
d) The consignment notification must include:

i) sufficient information to enable the identification of the package or packages including all applicable certificate numbers and identification marks;

ii) information on the date of shipment, the expected date of arrival and proposed routeing;

iii) the names of the radioactive material or nuclides;

iv) descriptions of the physical and chemical forms of the radioactive material, or whether it is special form radioactive material or low dispersible radioactive material; and

v) the maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with an appropriate SI prefix symbol (see 1;3.2). For fissile material, the mass of fissile material (or of each fissile nuclide for mixtures when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity.

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1.2.3 Determination of transport index (TI) and criticality safety index (CSI)

1.2.3.1 Determination of transport index

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1.2.3.1.4 Packages and overpacks must be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 5-2 and with the following requirements:

a) for a package or overpack, both the transport index and the surface radiation level conditions must be taken into account in determining which is the appropriate category. Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package or overpack must be assigned to the higher category. For this purpose, category I-WHITE must be regarded as the lowest category;

b) the transport index must be determined following the procedures specified in 1.2.3.1.1 and 1.2.3.1.2;

c) if the surface radiation level is greater than 2 mSv/h, the package or overpack must be transported under exclusive use and under the provisions of 7;2.9.5.3; as appropriate;

d) a package transported under a special arrangement must be assigned to category III-YELLOW except ~~when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2;7.2.4.6)~~ under the provisions of 1.2.3.1.5;

e) an overpack which contains packages transported under special arrangement must be assigned to category III-YELLOW except ~~when otherwise specified in the competent authority approval certificate of the country of origin of design (see 2;7.2.4.6)~~ under the provisions of 1.2.3.1.5.

1.2.3.1.5 In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, the categorization must be in accordance with the certificate of the country of origin of design.

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1.2.4 Specific provisions for excepted packages

1.2.4.1 Excepted packages must be legibly and durably marked on the outside of the packaging with:

a) the UN number preceded by the letters “UN”;

b) an identification of either the shipper or consignee, or both; and

c) the permissible gross mass if this exceeds 50 kg.

1.2.4.2 The documentation requirements of 5;4 do not apply to excepted packages of radioactive material, except that information must be shown on a transport document such as an air waybill or other similar document. The information required is as follows and should be shown in the following order:

a) the UN number preceded by the letters “UN”; and

b) the proper shipping name.

Where an agreement exists with the operator, the shipper may provide the information by EDP or EDI techniques.

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Chapter 2

PACKAGE MARKINGS

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2.4 MARKING SPECIFICATIONS AND REQUIREMENTS

2.4.1 Marking with proper shipping name and UN or ID number

2.4.1.1 Unless otherwise provided in these Instructions, the proper shipping name of the dangerous goods (supplemented with the technical name(s) if appropriate, see Part 3, Chapter 1) and, when assigned, the corresponding UN number preceded by the letters “UN” or “ID” as appropriate must be displayed on each package. In the case of unpackaged articles, the marking must be displayed on the article, on its cradle or on its handling, storage or launching device. A typical package marking would be:

“Corrosive liquid, acidic, organic, n.o.s. (caprylyl chloride) UN 3265”.

~~For packages containing limited quantities of dangerous goods, the UN number (preceded by the letters “UN”) may be placed within a diamond. If the diamond marking is applied, the following requirements must be met. The width of the line forming the diamond must be at least 2 mm; the number must be at least 6 mm high. When more than one substance is included in the package and the substances are assigned to different UN numbers, then the diamond must be large enough to include each relevant UN number.~~

≠ ~~Note.— It is anticipated that displaying the UN number within a diamond for packages containing limited quantities of dangerous goods will become mandatory as of 1 January 2011.~~

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2.4.2 Shipper and consignee identification

The name and address of the person who offers the dangerous goods for transport by air and of the consignee must be provided on each package and should be located on the same surface of the package near the proper shipping name marking, if the package dimensions are adequate.

2.4.3 Special marking requirements for explosives

~~Each package must be marked with the net quantity of explosive and the gross mass of the package.~~ The proper shipping name required by 2.4.1 may be supplemented by additional descriptive text to indicate commercial or military names.

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2.4.5 Special marking requirements for radioactive material

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e) ~~each excepted package must be marked with the UN number, preceded by the letters "UN"~~The marking of excepted packages must be as required by 1.2.4.

2.4.5.2 In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, marking must be in accordance with the certificate of the country of origin of the design.

2.4.6 Special marking requirements for refrigerated liquefied gas

The upright position of each package must be indicated prominently by ~~arrows or by using~~ either the "Package orientation" label (Figure 5-26) or pre-printed package orientation labels meeting the same specification as either Figure 5-26 or ISO Standard 780-1997. The label must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The wording "KEEP UPRIGHT" must be placed at 120° intervals around the package or on each side. Packages must also be clearly marked "DO NOT DROP — HANDLE WITH CARE".

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2.4.9 Special marking provisions for environmentally hazardous substances

2.4.9.1 Packages containing ~~substances or mixtures dangerous to the aquatic environment not presenting a danger covered by other classes, but classified by the shipper as dangerous goods (UN Nos. 3077 and 3082) (see Special Provision A97),~~ environmentally hazardous substances meeting the criteria of 2;9.2.1 a) (UN Nos. 3077 and 3082) must be durably marked with the environmentally hazardous substance mark, with the exception of single packagings and combination packagings ~~containing inner packagings with~~ where such single packagings or inner packagings of such combination packagings have:

— ~~contents~~ a net quantity of 5 L or less for liquids; or
— ~~contents~~ a net mass of 5 kg or less for solids.

2.4.9.2 The environmentally hazardous substance mark must be located adjacent to the markings required by 2.4.1.1. The requirements of 2.2.2 must be met.

2.4.9.3 The environmentally hazardous substance mark must be as shown in Figure 5-2. For packagings, the dimensions must be 100 mm × 100 mm, except in the case of packages of such dimensions that they can only bear smaller marks.

2.4.9.4 Regardless of the application of 2.4.9.1, all packages containing environmentally hazardous substances (UN Nos. 3077 and 3082) must bear a Class 9 hazard label.

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2.4.11 Additional markings of packages containing dangerous goods in limited quantities

~~Packages containing limited quantities of dangerous goods and prepared in accordance with 3;4 must be marked "limited quantity(ies)" or "LTD QTY".~~Provisions for the marking of packages containing dangerous goods in limited quantities are contained in 3;4.

2.4.12 Specific provisions for dangerous goods packed in excepted quantities

Provisions for the marking of packages containing dangerous goods in excepted quantities are contained in 3;5.

2.4.~~12~~13 Markings required by other modes of transport

Markings required by other international or national transport regulations are permitted in addition to markings required by these Instructions, provided that they cannot be confused with or conflict with any markings prescribed by these Instructions, because of their colour, design or shape.

2.4.~~13~~14 Special marking requirement for chemical oxygen generators

When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the statement "Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144" shall be marked adjacent to the proper shipping name on the package.

2.4.14 Marking requirements for IBCs used to transport UN 3077

Intermediate bulk containers must comply with the marking requirements applicable to other packagings, except that intermediate bulk containers of more than 450 L capacity must be marked with the proper shipping name and UN number, as required in 2.4.1, and the environmentally hazardous substance mark, on two opposing sides.

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Chapter 3

LABELLING

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3.2 APPLICATION OF LABELS

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3.2.6 Except when enlarged labels are used in accordance with 3.6, each package, overpack and freight container containing radioactive material must bear at least two labels which conform to Figures 5-18, 5-19 and 5-20 as appropriate according to the category (see 5;1.2.3.1.4) of that package, overpack or freight container. Labels must be affixed to two opposite sides on the outside of the package or on the outside of all four sides of the freight container. Each overpack containing radioactive material must bear at least two labels on opposite sides of the outside of the overpack. In addition, each package, overpack and freight container containing fissile material, other than fissile material excepted under the provisions of 6;7.10.2 must bear labels which conform to the model shown in Figure 5-21; such labels, where applicable, must be affixed adjacent to the labels for radioactive material. Labels must not cover the markings specified in Chapter 2. Any labels which do not relate to the contents must be removed or covered.

3.2.7 Intermediate bulk containers must comply with the labelling requirements applicable to other packagings, except that intermediate bulk containers of more than 450 L capacity must be labelled on two opposing sides.

Renumber subsequent paragraphs accordingly

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3.2.11 In addition to the class hazard labels specified in 3.1, handling labels must also be affixed to packages of dangerous goods as follows:

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b) when required by the provisions of 4;1.1.13, either the "Package orientation" label (Figure 5-26), or pre-printed package orientation labels meeting the same specification as either Figure 5-26 or ISO Standard 780-:1997, must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The words "Dangerous goods" may be inserted on the label below the line;

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3.3 LABELLING OF OVERPACKS

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3.3.2 An overpack containing single packages with end closures containing liquid dangerous goods must be labelled with either the “Package Orientation” label (Figure 5-26), or pre-printed package orientation labels meeting the same specification as either Figure 5-26 or ISO Standard 780-:1997, unless such labels are affixed to the package and are visible from the outside of the overpack. Such labels must be affixed to or printed on at least two opposite vertical sides of the overpack with the arrows pointing in the direction required to indicate the orientation of the overpack required to ensure that end closures are upward, notwithstanding that such single packages may also have side closures.

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3.5 LABEL SPECIFICATIONS

3.5.1 Class hazard label specifications

3.5.1.1 Class hazard labels must conform to the following specifications:

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Labelling of radioactive material

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h) Each label conforming to Figures 5-18, 5-19 and 5-20 must be completed with the following information:

1) Contents:

A) except for LSA-I material, the name(s) of the radionuclide(s) as taken from Table 2-12, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. The group of LSA or SCO must be shown following the name(s) of the radionuclide(s). The terms “LSA-II”,“LSA-III”, “SCO-I” and “SCO-II” must be used for this purpose;

B) for LSA-I material, the term “LSA-I” is all that is necessary; the name of the radionuclide is not necessary;

2) Activity: The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol. For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity;

3) For overpacks and freight containers the “contents” and “activity” entries on the label must bear the information required in 3.5.1.1 h) 1 A) and B), respectively, totalled together for the entire contents of the overpack or freight container except that on labels for overpacks or freight containers containing mixed loads of packages containing different radionuclides, such entries may read “See Transport Documents”;

4) Transport index: The number determined in accordance with 1.2.3.1.1 and 1.2.3.1.2. (No transport index entry is required for category I-WHITE.)

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k) In all cases of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, labelling must be in accordance with the certificate of the country of origin of design.

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3.5.2 Handling labels

3.5.2.1 Handling label specifications

An illustration of each of the handling labels showing the approved design and colour is given in Figures 5-24 to 5-26 and Figures 5-28 to 5-31. The minimum label dimensions are shown in the figures, however:

a) labels having dimensions not smaller than half of those indicated may be used on packages containing infectious substances when the packages are of dimensions such that they can only bear smaller labels; and

b) orientation labels may meet the specification of either Figure 5-26 or ISO Standard 780~~-~~:1997.

Editorial Note.— Proposed amendments to 5;3.5.2.2, which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

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Figure 5-14. Oxidizing substance, Class 5

~~*Note — It is anticipated that Figure 5-13 in the 2005-2006 edition of the Technical Instructions may continue to be used to denote organic peroxides until 31 December 2010.*~~

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Chapter 4

DOCUMENTATION

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Note.— These Instructions do not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an alternative to paper documentation~~.~~ ~~U~~Unless otherwise indicated, all references to "dangerous goods transport document" in this chapter also include provision of the required information by use of EDP and EDI transmission techniques.

4.1 DANGEROUS GOODS TRANSPORT INFORMATION

4.1.1 General

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4.1.3 Shipper and consignee

The name and address of the shipper and the consignee of the dangerous goods must be included on the dangerous goods transport document. For the transport of radioactive material, it is recommended that the telephone number of the consignee is included to facilitate a prompt release at the airport of destination.

4.1.4 Information required on the dangerous goods transport document

4.1.4.1 *Dangerous goods description*

The dangerous goods transport document must contain the following information for each dangerous substance, material or article offered for transport:

a) the UN or ID number preceded by the letters "UN" or "ID" as appropriate;

b) the proper shipping name, as determined according to 3;1.2, including the technical name enclosed in parenthesis, as applicable (see 3;1.2.7);

c) the primary hazard class or, when assigned, the division of the goods, including for Class 1 the compatibility group letter. The words “Class” or “Division” may be included preceding the primary hazard class or division numbers;

d) subsidiary hazard class or division number(s) corresponding to the subsidiary risk label(s) required to be applied, when assigned, must be entered following the primary hazard class or division and must be enclosed in parenthesis. The words “Class” or “Division” may be included preceding the subsidiary hazard class or division numbers;

e) where assigned, the packing group for the substance or article which may be preceded by “PG” (e.g. “PG II”).

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4.1.4.3 *Information which supplements the proper shipping name in the dangerous goods description*

The proper shipping name in the dangerous goods description must be supplemented as follows:

a) *Technical names for “n.o.s.” and other generic descriptions*: Proper shipping names that are assigned an asterisk in column 1 of the Dangerous Goods List must be supplemented with their technical or chemical group names as described in 3;1.2.7;

b) *Empty uncleaned packagings*: Empty means of containment which contain the residue of dangerous goods of classes other than Class 7 must be described as such by, for example, placing the words “Empty uncleaned” or “Residue last contained” before or after the ~~proper shipping name~~ dangerous goods description specified in 4.1.4.1 a) to e);

c) *Wastes*: For waste dangerous goods (other than radioactive wastes) which are being transported for disposal, or for processing for disposal, the proper shipping name must be preceded by the word “Waste”, unless this is already a part of the proper shipping name;

d) *Elevated temperature substances*: For solid substances, unless the word “Molten” is already included in the proper shipping name, it must be added to the proper shipping name on the dangerous goods transport document when a substance is offered for air transport in the molten state (see Part 3, Chapter 1).

4.1.5 Information required in addition to the dangerous goods description

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4.1.5.1 *Quantity of dangerous goods, number and type of packagings*

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UN packaging codes may only be used to supplement the description of the kind of package (e.g. one fibreboard box (4G)). Where the letter “G” follows the quantity in column 11 or 13 of Table 3-1 the gross mass of each package must be indicated, rather than the net quantity; and:

. . .

e) for items where “No Limit” or a packing instruction number is shown in columns ~~11~~ 10 ~~or~~ to 13 of Table 3-1, the quantity must be:

1) ~~the net mass or volume~~ for substances the net mass or volume (e.g. UN 2969, UN 3291)~~.~~;

2) ~~F~~for articles the gross mass, followed by the letter G (e.g. UN 2794, UN 2800, UN 2990, UN 3166) ~~the quantity must be the gross mass, followed by the letter G~~.

Note.— The number, type and capacity of each inner packaging within the outer packaging of a combination packaging is not required to be indicated.

Editorial Note.— Additional proposed amendments to 5;4.1.5.1 e), which relate to lithium batteries, are shown in Appendix D to the report on Agenda Item 5.

f) for explosive articles of Class 1, the net quantity indicated for each package must be supplemented with the net explosive mass (see Part 1;3.1.1 for the definition of net explosive mass) contained in the package followed by the unit of measurement. The abbreviations “NEQ”, “NEM” or “NEW” may be indicated in association with the value provided.

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4.1.5.7 *Radioactive material*

4.1.5.7.1 The following information must be included for each consignment of Class 7 material, as applicable, in the order given:

a) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;

b) A description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material. A generic chemical description is acceptable for chemical form;

c) The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with an appropriate SI prefix symbol (see 1;3.2). For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity;

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j) For LSA-II, LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of A_2. For radioactive material for which the A_2 value is unlimited, the multiple of A_2 must be zero.

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4.1.5.7.3 In all cases of international transport of packages requiring competent authorities design or shipment approval, for which different approval types apply in the different countries concerned by the shipment, the UN number and proper shipping name required in 4.1.4.1 must be in accordance with the certificate of the country of origin of design.

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Editorial Note.— Proposed amendments to 5;4.1.5.8.1, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

4.1.6 Certification

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4.1.6.2 If the dangerous goods documentation is presented to the operator by means of ~~electronic data processing (~~EDP~~)~~ or e~~lectronic data interchange (~~EDI~~)~~ transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign. Where the original consignment details are provided to an operator, by EDP or EDI techniques, and subsequently the consignment is transhipped to an operator that requires a paper dangerous goods transport document, the operator must ensure the paper document ~~must~~ indicates "Original Received Electronically" and the name of the signatory must be shown in capital letters.

4.1.6.3 In addition to the languages which may be required by the State of Origin, English should be used for the dangerous goods transport document.

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Editorial Note.— Proposed amendments to 5;4.3, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

~~**4.4 DOCUMENTATION FOR RADIOACTIVE MATERIAL, EXCEPTED PACKAGE**~~

~~Excepted packages of radioactive material must be shown on the air waybill or other similar document (such as a consignment note) by the appropriate proper shipping name and UN number as shown in the list below. This information must be included with the description of the goods:~~

~~a) "Radioactive material, excepted package — empty packaging" (UN 2908);~~

~~b) "Radioactive material, excepted package — articles manufactured from natural uranium" (UN 2909); or "Radioactive material, excepted package — articles manufactured from depleted uranium" (UN 2909); or "Radioactive material, excepted package — articles manufactured from natural thorium" (UN 2909);~~

~~c) "Radioactive material, excepted package — limited quantity of material" (UN 2910);~~

~~d) "Radioactive material, excepted package — instruments" (UN 2911); or "Radioactive material, excepted package — articles" (UN 2911).~~

~~(See 1;6.1.5.1.)~~

4.4 RETENTION OF DANGEROUS GOODS TRANSPORT INFORMATION

4.5.1 The shipper must retain a copy of the dangerous goods transport document and additional information and documentation as specified in these Instructions, for a minimum period of three months.

4.5.2 When the documents are kept electronically or in a computer system, the shipper must be able to reproduce them in a printed form.

Part 6

PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

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Chapter 1

APPLICABILITY, NOMENCLATURE AND CODES

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Editorial Note.— Additional proposed amendments to Part 6; 1, which relate to the new, reformatted packing instructions, are shown in Appendix E to the report on Agenda Item 5.

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). In addition to the listed packagings, intermediate bulk containers are permitted for UN 3077 as shown in Packing Instruction 956.

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Chapter 2

MARKING OF PACKAGINGS OTHER THAN INNER PACKAGINGS

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2.4 PACKAGING MARKINGS FOR INTERMEDIATE BULK CONTAINERS

2.4.1 Intermediate bulk containers, which meet the requirements of Chapter 6.5 of the UN Recommendations, must be marked with a packaging marking.

2.4.2 The packaging marking consists of:

a) the United Nations packaging symbol 

For metal IBCs on which the marking is stamped or embossed, the capital letters “UN” may be applied instead of the symbol;

b) The code designating the type of IBC as shown in Packing Instruction 956 and as described in detail in Chapter 6.5 of the UN Recommendations;

c) A capital letter designating the packing group(s) for which the design type has been approved:

1) X for Packing Groups I, II and III;

2) Y for Packing Groups II and III;

3) Z for Packing Group III only;

d) The month and year (last two digits) of manufacture;

e) The State authorizing the allocation of the mark; indicated by the distinguishing sign for motor vehicles in international traffic;

f) The name or symbol of the manufacturer and other identification of the IBC as specified by the appropriate national authority;

g) The stacking test load in kg. For IBCs not designed for stacking, the figure "0" must be shown;

h) The maximum permissible gross mass in kg.

2.4.3 The maximum permitted stacking load applicable when the IBC is in use must be displayed on a symbol as follows:

The mass marked above the symbol must not exceed the load imposed during the design type test (see 6.5.6.6.4 of the UN Model Regulations) divided by 1.8.

2.4.4 Example of a marking is:

(UN) 13H3/Z/03 01 as in as in 2.4.2 a), b),c), and d)
F/Meunier1713/0/1000 as in 2.4.2 e), f), g) and h

Chapter 3

REQUIREMENTS FOR PACKAGINGS

3.1 REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

3.1.0 General requirements

Any permeation of the substance contained in the packaging must not constitute a danger under normal conditions of transport.

Editorial Note.— Additional proposed amendments to Part 6; 3, which relate to the new, reformatted packing instructions, are shown in Appendix E to the report on Agenda Item 5.

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Chapter 4

PACKAGING PERFORMANCE TESTS

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4.3 DROP TEST

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4.3.6 Criteria for passing the test

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4.3.6.3 The packaging or outer packaging of a composite or combination packaging must not exhibit any damage liable to affect safety during transport. Inner receptacles, inner packagings, or articles must remain completely within the outer packaging and ~~T~~there must be no leakage of the filling substance from the inner receptacle or inner packaging(s).

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Chapter 5

≠ # REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

Note 1.— Aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas are not subject to the requirements of 6;5.1 to 6;5.3.

Note 2.— For open cryogenic receptacles the requirements of Packing Instruction 202 must be met.

5.1 GENERAL REQUIREMENTS

~~≠ *Note 1.— For aerosol dispensers, small receptacles containing gas (gas cartridges) and fuel cell cartridges containing liquefied flammable gas see 5.4.*~~

~~*Note 2.— For open cryogenic receptacles the requirements of Packing Instruction 202 must be met.*~~

5.1.1 Design and construction

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5.1.1.5 The test pressure of cylinders must be in accordance with Packing Instruction 200. The test pressure for closed cryogenic receptacles must be in accordance with Packing Instruction 202. The test pressure of a metal hydride storage system must be in accordance with Packing Instruction 214.

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5.1.3 Service equipment

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5.1.3.4 Individual cylinders and closed cryogenic receptacles must be equipped with pressure relief devices as specified in Packing Instruction 200(1) ~~or~~, 202 or 214, or 5.1.3.6.4 and 5.1.3.6.5. Pressure-relief devices must be designed to prevent the entry of foreign matter, the leakage of gas and the development of any dangerous excess pressure.

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5.1.5 Initial inspection and testing

5.1.5.1 New cylinders, other than closed cryogenic receptacles and metal hydride storage systems, must be subjected to inspection and testing during and after manufacture in accordance with the applicable design standards including the following:

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5.1.5.3 For metal hydride storage systems, it must be verified that the inspections and tests specified in 5.1.5.1 a), b), c), d), e) if applicable, f), g), h) and i) have been performed on an adequate sample of the receptacles used in the metal hydride storage system. In addition, on an adequate sample of metal hydride storage systems, the inspections and tests specified in 5.1.5.1 c) and f) must be performed, as well as 5.1.5.1 e), if applicable, and inspection of the external conditions of the metal hydride storage system. Additionally, all metal hydride storage systems must undergo the initial inspections and tests specified in 5.1.5.1 h) and i), as well as a leakproofness test and a test of the satisfactory operation of the service equipment.

5.1.6 Periodic inspection and testing

5.1.6.1 Refillable cylinders must be subjected to periodic inspections and tests by a body authorized by the appropriate national authority, in accordance with the following:

a) check of the external conditions of the cylinder and verification of the equipment and the external markings;

b) check of the internal conditions of the cylinder (e.g. internal inspection, verification of minimum wall thickness);

c) check of the threads if there is evidence of corrosion or if the fittings are removed;

d) a hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests;

Note 1.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

Note 2.— With the agreement of the appropriate national authority, the hydraulic pressure test of cylinders may be replaced by an equivalent method based on acoustic emission testing~~, ultrasonic examination~~ or a combination of acoustic emission testing and ultrasound examination. ISO 16148:2006 may be used as a guide for acoustic emission testing procedures.

Note 3.— The hydraulic pressure test may be replaced by ultrasonic examination carried out in accordance with ISO 10461:2005+A1:2006 for seamless aluminium alloy gas cylinders and in accordance with ISO 6406:2005 for seamless steel gas cylinders.

e) check of service equipment, other accessories and pressure-relief devices, if to be reintroduced into service.

Note.— For the periodic inspection and test frequencies, see Packing Instruction 200.

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5.2 REQUIREMENTS FOR UN CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES

In addition to the general requirements of 5.1, UN cylinders and closed cryogenic receptacles must comply with the requirements of this section, including the standards, as applicable.

Note.— With the agreement of the appropriate national authority, more recently published versions of the standards, if available, may be used.

5.2.1 Design, construction and initial inspection and testing

5.2.1.1 The following standards apply for the design, construction and initial inspection and test of UN cylinders, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

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ISO 7866:1999 Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing.

Note.— The note concerning the F factor in section 7.2 of this standard must not be applied for UN cylinders. Aluminium alloy 6351A — T6 or equivalent must not be authorized.

ISO 4706:2008 Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below

ISO 18172-1:2007 Gas cylinders – Refillable welded stainless steel cylinders – Part 1: Test pressure 6 MPa and below

ISO 20703:2006 Gas cylinders – Refillable welded aluminium-alloy cylinders – Design, construction and testing

Editorial Note.— Indent removed before Note below.

Note 1.— In the above referenced standards composite cylinders must be designed for unlimited service life.

Note 2.— After the first 15 years of service, composite cylinders manufactured according to these standards, may be approved for extended service by the appropriate national authority which was responsible for the original approval of the cylinders and which will base its decision on the test information supplied by the manufacturer or owner or user.

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5.2.1.5 The following standards apply for the design, construction, and initial inspection and test of UN metal hydride storage systems, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

ISO 16111:2008 Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.

5.2.2 Materials

In addition to the material requirements specified in the cylinder and closed cryogenic receptacle design and construction standards, and any restrictions specified in the applicable Packing Instruction for the gas(es) to be transported (e.g. Packing Instruction 200 ~~or~~, Packing Instruction 202 or Packing Instruction 214), the following standards apply to material compatibility:

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5.2.3 Service equipment

The following standards apply to closures and their protection:

ISO 11117:1998 Gas cylinders — Valve protection caps and valve guards for industrial and medical gas cylinders — Design, construction and tests.

ISO 10297:~~1999~~2006 Gas cylinders — Refillable gas cylinder valves — Specification and type testing.

For UN metal hydride storage systems, the requirements specified in the following standard apply to closures and their protection:

ISO 16111:2008 Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.

5.2.4 Periodic inspection and test

The following standards apply to the periodic inspection and testing of UN cylinders and UN metal hydride storage systems:

≠ ISO 6406:2005 Seamless steel gas cylinders — Periodic inspection and testing.

≠ ISO 10461:2005/A1:2006 Seamless aluminium-alloy gas cylinders — Periodic inspection and testing.

≠ ISO 10462:2005 Transportable cylinders for dissolved acetylene — Periodic inspection and maintenance.

SO 11623:2002Transportable gas cylinders — Periodic inspection and testing of composite gas cylinders.

ISO 16111:2008 Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.

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5.2.7 Marking of UN refillable cylinders and closed cryogenic receptacles

Note.— Marking requirements for UN metal hydride storage systems are given in 5.2.9.

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5.2.9 Marking of UN metal hydride storage systems

5.2.9.1 UN metal hydride storage systems must be marked clearly and legibly with the marks listed below. These marks must be permanently affixed (e.g. stamped, engraved, or etched) on the metal hydride storage system. The marks must be on the shoulder, top end or neck of the metal hydride storage system or on a permanently affixed component of the metal hydride storage system. Except for the United Nations packaging symbol, the minimum size of the marks must be 5 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 2.5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm. The minimum size of the United Nations packaging symbol must be 10 mm for metal hydride storage systems with a smallest overall dimension greater than or equal to 140 mm and 5 mm for metal hydride storage systems with a smallest overall dimension less than 140 mm.

5.2.9.2 The following marks must be applied:

a) The UN packaging symbol 

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

b) “ISO 16111” (the technical standard used for design, manufacture and testing);

c) The character(s) identifying the country of approval, as indicated by the distinguishing signs of motor vehicles in international traffic;

d) The identity mark or stamp of the inspection body that is registered with the appropriate national authority of the country authorizing the marking;

e) The date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (i.e. "/");

f) The test pressure of the cylinder in bar, preceded by the letters “PH” and followed by the letters “BAR”;

g) The rated charging pressure of the metal hydride storage system in bar, preceded by the letters “RCP” and followed by the letters “BAR”;

h) The manufacturer’s mark registered by the appropriate national authority. When the country of manufacture is not the same as the country of approval, then the manufacturer’s mark must be preceded by the character(s) identifying the country of manufacture as indicated by the distinguishing signs of motor vehicles in international traffic. The country mark and the manufacturer’s mark must be separated by a space or slash;

i) The serial number assigned by the manufacturer;

j) In the case of steel cylinders and composite cylinders with steel liner, the letter “H” showing compatibility of the steel (see 1SO 11114-1:1997); and,

k) In the case of metal hydride storage systems having limited life, the date of expiry, denoted by the letters “FINAL” followed by the year (four digits) followed by the month (two digits) separated by a slash (i.e. “/”).

The certification marks specified in a) to e) above must appear consecutively in the sequence given. The test pressure f) must be immediately preceded by the rated charging pressure g). The manufacturing marks specified in h) to k) above must appear consecutively in the sequence given.

5.2.9.3 Other marks are allowed in areas other than the side wall, provided they are made in low stress areas and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

5.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

a) The character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign of motor vehicles in international traffic. This marking is not required if this body is approved by the appropriate national authority of the country approving manufacture;

b) The registered mark of the body authorised by the appropriate national authority for performing periodic inspection and test;

c) The date of the periodic inspection and test, the year (two digits) followed by the month (two digits) separated by a slash (i.e. "/"). Four digits may be used to indicate the year.

The above marks must appear consecutively in the sequence given.

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5.4 REQUIREMENTS FOR AEROSOL DISPENSERS, SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES) AND FUEL CELL CARTRIDGES CONTAINING LIQUEFIED FLAMMABLE GAS

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

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5.4.2 Aerosol dispensers

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5.4.3 With the approval of the appropriate national authority, aerosols and receptacles, small, ~~containing pharmaceutical products and non flammable gases which are required to be sterile, but may be adversely affected by water bath testing,~~ are not subject to 5.4.1 and 5.4.2 if~~:~~ they are required to be sterile but may be adversely affected by water bath testing, provided:

a) they contain a non-flammable gas and either:

i) contain other substances that are constituent parts of pharmaceutical products for medical, veterinary or similar purposes;

ii) contain other substances used in the production process for pharmaceutical products; or

iii) are used in medical, veterinary or similar applications;

~~a) they are manufactured under the authority of a national health administration and, if required by the appropriate national authority, follow the principles of Good Manufacturing Practice (GMP) established by the World Health Organization (WHO)*; and~~

b) an equivalent level of safety is achieved by the manufacturer's use of alternative methods for leak detection and pressure resistance, such as helium detection and water bathing a statistical sample of at least 1 in 2 000 from each production batch; and

c) for pharmaceutical products according to a) i) and iii) above, they are manufactured under the authority of a national health administration. If required by the appropriate national authority, the principles of Good Manufacturing Practice (GMP) established by the World Health Organization (WHO)* must be followed..

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Chapter 6

PACKAGINGS FOR INFECTIOUS SUBSTANCES OF CATEGORY A

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6.5 TEST REQUIREMENTS FOR PACKAGINGS

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6.5.4 Puncture test

6.5.4.1 *Packagings with a gross mass of 7 kg or less*

Samples must be placed on a level, hard surface. A cylindrical steel rod with a mass of at least 7 kg, a diameter of 38 mm and the impact end edges of a radius not exceeding 6 mm (see Figure 6-1) must be dropped in a vertical free fall from a height of one metre measured from the impact end to the impact surface of the sample. One sample must be placed on its base. A second sample must be placed in an orientation perpendicular to that used for the first sample. In each instance, the steel rod must be aimed to impact the primary receptacle. Following each impact, penetration of the secondary packaging is acceptable, provided that there is no leakage from the primary receptacle(s).

6.5.4.2 *Packagings with a gross mass exceeding 7 kg*

Samples are dropped onto the end of a cylindrical steel rod. The rod must be set vertically on a level, hard surface. It must have a diameter of 38 mm with the upper end edges of a radius not exceeding 6 mm (see Figure 6-1). The rod must protrude from the surface a distance at least equal to the distance between the centre of the primary receptacle(s) and the outer surface of the outer packaging, with a minimum protrusion of 200 mm. One sample is dropped with its top face lowermost in a vertical free fall from a height of 1 m, measured from the top of the steel rod. A second sample is dropped from the same height in an orientation perpendicular to that used for the first sample. In each instance, the packaging must be so orientated that the steel rod would be capable of penetrating the primary receptacle(s). Following each impact, penetration of the secondary packaging is acceptable provided that there is no leakage from the primary receptacle(s).

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* WHO Publication: Quality assurance of pharmaceuticals. A compendium of guidelines and related materials. Volume 2: Good manufacturing practices and inspection.

Insert new Figure 6-1:

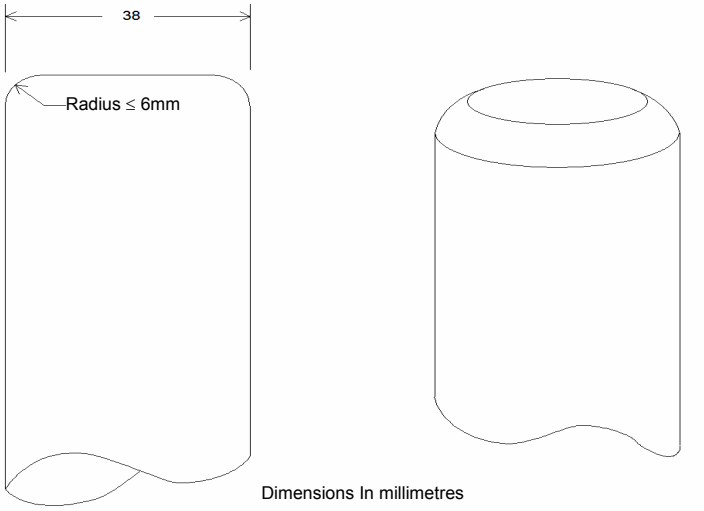

Figure 6-1. Cylindrical steel rod used for puncture test

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Chapter 7

REQUIREMENTS FOR THE CONSTRUCTION, TESTING AND APPROVAL OF PACKAGES AND MATERIAL OF CLASS 7

Parts of this Chapter are affected by State Variations CA 1, CA 3, CA 4, DE 2, DK 1, JP 8, JP 26, US 10; see Table A-1

7.1 GENERAL REQUIREMENTS

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7.1.9 All valves through which the radioactive contents could ~~otherwise~~ escape must be protected against unauthorized operation.

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7.4 REQUIREMENTS FOR INDUSTRIAL PACKAGES

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7.4.4 Alternative requirements for industrial packages Types 2 and 3 (Types IP-2 and IP-3)

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7.4.4.2 Freight containers ~~of a~~ with the characteristics of a permanent enclos~~ed~~ure ~~character~~ may also be used as Industrial package Types 2 or 3 (Types IP-2 or IP-3), provided that:

a) the radioactive contents are restricted to solid materials;

b) they satisfy the requirements of 7.4.1; and

c) they are designed to conform to ISO 1496-1:1990: "Series 1 freight containers — Specification and testing — Part 1: General cargo containers" and subsequent amendments 1:1993, 2:1998, 3:2005, 4:2006 and 5:2006, excluding dimensions and ratings. They must be designed so that, if subjected to the tests prescribed in that document and to the accelerations occurring during routine conditions of transport, they would prevent:

i) loss or dispersal of the radioactive contents; and

ii) more than a 20 per cent increase in the maximum radiation level at any external surface of the freight containers.

7.5 REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE

7.5.1 Packages designed to contain uranium hexafluoride must meet the requirements prescribed elsewhere in these Instructions which pertain to the radioactive and fissile properties of the material. Except as allowed in 7.5.4, uranium hexafluoride in quantities of 0.1 kg or more must also be packaged and transported in accordance with the provisions of ISO 7195:~~1993~~2005: "Nuclear Energy — Packaging of uranium hexafluoride (UF_6) for transport", and the requirements of 7.5.2 and 7.5.3. The package must also meet the requirements prescribed elsewhere in these Instructions, which pertain to the radioactive and fissile properties of the material.

7.5.2 Each package designed to contain 0.1 kg or more of uranium hexafluoride must be designed so that it would meet the following requirements:

a) withstand, without leakage and without unacceptable stress, as specified in ISO 7195:~~1993~~2005, the structural test as specified in 7.20;

b) withstand, without loss or dispersal of the uranium hexafluoride, the free drop test specified in 7.14.4; and

c) withstand, without rupture of the containment system, the thermal test specified in 7.16.3.

7.5.3 Packages designed to contain 0.1 kg or more of uranium hexafluoride must not be provided with pressure relief devices.

7.5.4 Subject to the approval of the competent authority, packages designed to contain 0.1 kg or more of uranium hexafluoride may be transported if:

a) the packages are designed to international or national standards other than ISO 7195:~~1993~~2005 provided an equivalent level of safety is maintained;

b) the packages are designed to withstand, without leakage and without unacceptable stress, a test pressure of less than 2.76 MPa, as specified in 7.20;

c) for packages designed to contain 9 000 kg or more of uranium hexafluoride, the packages do not meet the requirement of 7.5.2 c).

In all other respects, the requirements specified in 7.5.1 to 7.5.3 must be satisfied.

7.6 REQUIREMENTS FOR TYPE A PACKAGES

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7.6.16 Type A packages to contain liquids

A Type A package designed to contain liquid radioactive material must, in addition:

a) be adequate to meet the conditions specified in 7.6.14 a) if the package is subjected to the tests specified in 7.15; and

b) either:

i) be provided with sufficient absorbent material to absorb twice the volume of the liquid contents. Such absorbent material must be suitably positioned so as to contact the liquid in the event of leakage; or

ii) be provided with a containment system composed of primary inner and secondary outer containment components, designed to ~~ensure retention of the~~ enclose the liquid contents completely and ensure their retention within the secondary outer containment components, even if the primary inner components leak.

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7.10 REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

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7.10.5 The package, after being subjected to the tests specified in 7.14, must~~.~~:

a) preserve the minimum overall outside dimensions of the package to at least 10 cm; and

b) prevent the entry of a 10-cm cube.

7.10.6 The package must be designed for an ambient temperature range of –40°C to +38°C unless the competent authority specifies otherwise in the certificate of approval for the package design.

7.10.7 For a package in isolation, it must be assumed that water can leak into or out of all void spaces of the package, including those within the containment system. However, if the design incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features must include the following:

a) multiple high standard water barriers~~, each of which~~ not less than two of which would remain watertight if the package were subject to the tests prescribed in 7.10.12 b), a high degree of quality control in the manufacture, maintenance and repair of packagings and tests to demonstrate the closure of each package before each shipment; or

. . .

7.12 TESTING THE INTEGRITY OF THE CONTAINMENT SYSTEM AND SHIELDING AND EVALUATING CRITICALITY SAFETY

After each of the applicable tests specified in 7.14 to 7.20:

a) faults and damages must be identified and recorded;

b) it must be determined whether the integrity of the containment system and shielding has been retained to the extent required in 7.1 to 7.10 for the package under test; and

c) it must be determined, for packages containing fissile material, whether the assumptions and conditions used in the assessments required by 7.10.1 to 7.10~~.12~~13 for one or more packages are valid.

. . .

7.14 TESTS FOR DEMONSTRATING ABILITY TO WITHSTAND NORMAL CONDITIONS OF TRANSPORT

. . .

7.14.5 Stacking test: unless the shape of the packaging effectively prevents stacking, the specimen must be subjected, for a period of 24 hours, to a compressive load equal to the greater of the following:

a) ~~the equivalent of 5 times the mass of the actual package~~a total weight equal to five times the maximum weight of the package; and

b) the equivalent of 13 kPa multiplied by the vertically projected area of the package.

The load must be applied uniformly to two opposite sides of the specimen, one of which must be the base on which the package would typically rest.

Part 7

OPERATOR'S RESPONSIBILITIES

. . .

Chapter 1

ACCEPTANCE PROCEDURES

. . .

1.2 ACCEPTANCE OF DANGEROUS GOODS BY OPERATORS

1.2.1 An operator must not accept for transport aboard an aircraft a package or overpack containing dangerous goods or a freight container containing radioactive material or a unit load device or other type of pallet containing the dangerous goods as described in 1.4.1 b) and c) unless:

a) it is accompanied by two copies of the dangerous goods transport document; or

b) the information applicable to the consignment is provided in electronic form; or

c) it is accompanied, where permitted, by alternative documentation.

1.2.2 Where a dangerous goods transport document is provided in accordance with 1.2.1 a), one copy must accompany the consignment to final destination and one copy must be retained by the operator at a location on the ground where it will be possible to obtain access to it within a reasonable period; the document must be retained at this point until the goods have arrived at final destination, after which time it may be stored elsewhere.

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Chapter 2

STORAGE AND LOADING

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2.1 LOADING RESTRICTIONS ON THE FLIGHT DECK AND FOR PASSENGER AIRCRAFT

2.1.1 Dangerous goods must not be carried in an aircraft cabin occupied by passengers or on the flight deck of an aircraft, except as permitted by 1;2.2.1 and 8;1 and for radioactive material, excepted packages under 2;7.2.4.1.1. Dangerous goods may be carried in a main deck cargo compartment of a passenger aircraft provided that compartment meets all the certification requirements for a Class B or a Class C aircraft cargo compartment. Dangerous goods bearing the "Cargo aircraft only" label must not be carried on a passenger aircraft.

Editorial Note.— Proposed amendments to 7;2.1.2, which relate to approvals and exemptions, are shown in Appendix B to the report on Agenda Item 5.

2.1.2 Under the conditions specified in S-7;2.2 of the Supplement, the State of Origin may approve the transport of dangerous goods in main deck cargo compartments of passenger aircraft that do not meet the requirements in 2.1.1.

Note.— Cargo compartment classification is described in the ICAO document Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods *(Doc 9481).*

. . .

2.2.2 Separation of explosive substances and articles

. . .

2.2.2.5 ~~Explosives in Division 1.4B and explosives in Division 1.3 must not be stowed together. Division 1.4B and Division 1.3 explosives must be loaded into separate unit load devices and, when stowed aboard the aircraft, the unit load devices must be separated by other cargo with a minimum separation distance of 2 m. When not loaded in a unit load device, Division 1.4B and Division 1.3 explosives must be loaded into different, non adjacent loading positions and separated by other cargo with a minimum separation distance of 2 m.~~ For explosives of different division numbers and compatibility groups the segregation scheme shown in Table 7-2 must be followed in order to maintain acceptable distance between such packages.

Table 7-2. Separation of explosive substances and articles

Division and compatibility group	1.3C	1.3G	1.4B	1.4C	1.4D	1.4E	1.4G	1.4S
1.3C			x					
1.3G			x					
1.4B	x	x		x	x	x	x	
1.4C			x					
1.4D			x					
1.4E			x					
1.4G			x					
1.4S								

An "x" at the intersection of a row and column indicates that explosives of these divisions and compatibility groups must be loaded into separate unit load devices and, when stowed aboard the aircraft, the unit load devices must be separated by other cargo with a minimum separation distance of 2 m. When not loaded in a unit load device, these explosives must be loaded into different, non-adjacent loading positions and separated by other cargo with a minimum separation distance of 2 m.

Renumber subsequent tables in Part 7 accordingly.

. . .

2.4 LOADING AND SECURING OF DANGEROUS GOODS

2.4.1 Loading on cargo aircraft

2.4.1.1 Packages or overpacks of dangerous goods bearing the "Cargo aircraft only" label must be loaded on a cargo aircraft in accordance with one of the following provisions:

a) in a Class C aircraft cargo compartment; or

b) in a unit load device equipped with a fire detection/suppression system equivalent to that required by the certification requirements of a Class C aircraft cargo compartment as determined by the appropriate national authority (a ULD that is determined by the appropriate national authority to meet the Class C aircraft cargo compartment standards must include "Class C compartment" on the ULD tag); or

c) in such a manner that in the event of an emergency involving such packages or overpacks, a crew member or other authorized person can access those packages or overpacks, and can handle and, where size and mass permit, separate such packages or overpacks from other cargo.

Note.— Cargo compartment classification is described in the ICAO document Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods *(Doc 9481).*

2.4.1.2 The requirements of 2.4.1.1 do not apply to:

a) substances of Class 3, Packing Group III, ~~without a subsidiary risk~~ other than those with a subsidiary risk of Class 8;

b) toxic and infectious substances (Class 6);

c) radioactive material (Class 7);

d) miscellaneous dangerous goods (Class 9).

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

. . .

2.10 LOADING OF MAGNETIZED MATERIAL

~~Magnetized material must not be loaded in such a position that it will have a significant effect on the direct-reading magnetic compasses or on the master compass detector units. The significant effect will be produced if the magnetic field strength of the magnetized materials reaches 0.418 A/m at the location of aircraft compasses or compass detector units. The minimum stowage distance of the magnetized material to the aircraft compasses or compass detector units will depend on the intensity of the magnetized material's field strength and varies from 1.5 m for material which just meets the threshold level of the magnetized material definition in 2;9, to 4.6 m for materials which possesses the maximum field strength permitted by Packing Instruction 902 in 4;11. If the minimum stowage distance of a specific item, in its packed form, from the compass or detector units is not known and cannot be estimated, or if material which is to be transported affects the aircraft's compasses, a special minimum stowage distance check must be made on the freight to be transported. Multiple packages may produce a cumulative effect. See Packing Instruction 902 for determination of shielding requirements~~ Magnetized material must be loaded so that headings of aircraft compasses are maintained within the tolerances prescribed by the applicable aircraft airworthiness requirements and, where practical, in locations minimizing possible effects on compasses. Multiple packages may produce a cumulative effect. For magnetized material transported under the conditions of an approval described in Packing Instruction 953, loading must be in accordance with conditions specified in the authorizing approval..

Note.— Masses of ferro-magnetic metals such as automobiles, automobile parts, metal fencing, piping and metal construction material, even if not meeting the definition of magnetized materials may ~~be subject to the operator's special stowage requirements since they may affect aircraft instruments, particularly the compasses. Additionally, packages or items of material which individually do not meet the definition of magnetized materials but cumulatively may do so, may also be subject to the operator's special stowage requirements~~ affect aircraft compasses, as may packages or items which individually do not meet the definition of magnetized material but cumulatively may have a magnetic field strength of a magnetized material.

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Chapter 4

PROVISION OF INFORMATION

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4.1 INFORMATION TO THE PILOT-IN-COMMAND

4.1.1 The operator of an aircraft in which dangerous goods are to be carried must provide the pilot-in-command, as early as practicable before departure of the aircraft, with accurate and legible written or printed information concerning dangerous goods that are to be carried as cargo.

. . .

f) the net quantity, or gross mass if applicable, of each package, except that this does not apply to radioactive material or other dangerous goods where the net quantity or gross mass is not required on the dangerous goods transport document (see 5;4.1.4) or, when applicable, alternative written documentation. For a consignment consisting of multiple packages containing dangerous goods bearing the same proper shipping name and UN number or ID number, only the total quantity and an indication of the quantity of the largest and smallest package at each loading location need to be provided. For unit load devices or other types of pallets containing consumer commodities accepted from a single shipper, the number of packages and the average gross mass need to be provided;

. . .

4.5 REPORTING OF UNDECLARED OR MISDECLARED DANGEROUS GOODS

An operator must report any occasion when undeclared or misdeclared dangerous goods are discovered in cargo or mail. Such a report must be made to the appropriate authorities of the State of the Operator and the State in which this occurred. An operator must also report any occasion when dangerous goods not permitted under 8;1.1.1 are discovered in passengers' baggage. Such a report must be made to the appropriate authority of the State in which this occurred.

. . .

4.7 CARGO ACCEPTANCE AREAS — PROVISION OF INFORMATION

An operator or the operator's handling agent must ensure that notices giving information about the transport of dangerous goods~~,~~ are sufficient in number ~~and~~, prominently displayed~~,~~ and ~~are~~ provided at a visible location(s) at the cargo acceptance points ~~for cargo~~ to alert shippers/agents about any dangerous goods that may be contained in their cargo consignment(s). These notices must include visual examples of dangerous goods, including batteries.

Note.— Existing notices that do not include visual examples of dangerous goods, including batteries, may continue to be used until 31 December 2011 after which time the requirements specified above will apply.

. . .

4.10 RETENTION OF DOCUMENTS

The operator must ensure that at least one copy of the documents appropriate to the transport by air of a consignment of dangerous goods is retained for a minimum period of three months~~, or such other period as specified by the States concerned,~~ after the flight on which the dangerous goods were transported. As a minimum, the documents which must be retained are the dangerous goods transport documents, the acceptance checklist (when this is in a form which requires physical completion) and the written information to the pilot-in-command.

Note.— Where the documents are kept electronically or in a computer system, they should be capable of being reproduced in a printed manner.

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Chapter 5

PROVISIONS CONCERNING PASSENGERS AND CREW

5.1 INFORMATION TO PASSENGERS

5.1.1 An operator must ensure that information on the types of dangerous goods which a passenger is forbidden to transport aboard an aircraft is provided ~~with the passenger ticket or made available in another manner to passengers prior to the check-in process~~ at the point of ticket purchase. Information provided via the Internet may be in text or pictorial form but must be such that ticket purchase cannot be completed until the passenger, or a person acting on their behalf, has indicated that they have understood the restrictions on dangerous goods in baggage.

5.1.2 An operator or the operator's handling agent and the airport operator must ensure that notices warning passengers of the types of dangerous goods which they are forbidden to transport aboard an aircraft are prominently displayed, in sufficient number, at each of the places at an airport where tickets are issued, passengers are checked in and aircraft boarding areas are maintained, and at any other location where passengers are checked in. These notices must include visual examples of dangerous goods forbidden from transport aboard an aircraft.

~~*Note.— Existing notices that do not include visual examples of dangerous goods may continue in place until 31 December 2009 after which time the requirements specified above will apply.*~~

5.1.3 An operator, of passenger aircraft, should have information on those dangerous goods which may be carried by passengers in accordance with 8;1.1.2 available prior to the check-in process on their web sites or other sources of information.

5.1.4 When provision is made for the check-in process to be completed remotely (e.g. via the Internet), the operator should ensure that information on the types of dangerous goods which a passenger is forbidden to transport aboard an aircraft is provided to passengers. Information may be in text or pictorial form but should be such that the check-in process cannot be completed until the passenger, or a person acting on their behalf, has indicated that they have understood the restrictions on dangerous goods in baggage.

5.1.5 When provision is made for the check-in process to be completed at an airport by a passenger without the involvement of any other person (e.g. automated check-in facility), the operator or the airport operator should ensure that information on the types of dangerous goods which a passenger is forbidden to transport aboard an aircraft is provided to passengers. Information should be in pictorial form and should be such that the check-in process cannot be completed until the passenger has indicated that they have understood the restrictions on dangerous goods in baggage.

Note.— The requirements in 5.1.4 and 5.1.5 will become mandatory in the 2013-2014 edition of the Instructions.

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Chapter 6

PROVISIONS TO AID RECOGNITION OF UNDECLARED DANGEROUS GOODS

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6.1 With the aim of preventing undeclared dangerous goods from being loaded on an aircraft and of preventing passengers from taking on board those dangerous goods which they are not permitted to have in their baggage (see 8;1.1.2), information about:

a) general descriptions that are often used for items in cargo or in passengers' baggage which may contain dangerous goods;

b) other indications that dangerous goods may be present (e.g. labels, markings); and

c) those dangerous goods which may be carried by passengers in accordance with 8;1.1.2,

must be provided to cargo reservations and sales staff, cargo acceptance staff, passenger reservations and sales staff and passenger check-in staff as appropriate and must be readily available to such staff. The following is a list of general descriptions and the types of dangerous goods that may be included in any item bearing that description.

. . .

unaccompanied passengers' baggage/personal effects — may contain items meeting any of the criteria for dangerous goods. Examples include fireworks, flammable household liquids, corrosive oven or drain cleaners, flammable gas or liquid lighter refills or camping stove cylinders, matches, bleach, aerosols, etc.

*Note.— E*xcess baggage carried as cargo may contain certain dangerous goods, as provided for by 1;1.1.3.1 g

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Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

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Chapter 1

PROVISIONS FOR DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

1.1.1 Except as otherwise provided in 1.1.2, dangerous goods, including excepted packages of radioactive material, must not be carried by passengers or crew members, either as or in carry-on baggage or checked baggage or on their person. Except as provided for in 1.1.2 z) below, ~~S~~security type equipment such as attaché cases, cash boxes, cash bags, etc., incorporating dangerous goods, for example lithium batteries or pyrotechnic material, are totally forbidden; see entry in Table 3-1. Personal medical oxygen devices that utilize liquid oxygen are prohibited either as or in carry-on baggage or checked baggage or on the person. Electro shock weapons (e.g. Tasers) containing dangerous goods such as explosives, compressed gases, lithium batteries, etc. are prohibited in carry-on baggage or checked baggage or on the person.

1.1.2 Notwithstanding any additional restrictions which may be implemented by States in the interests of aviation security, except for the incident reporting provisions of 7;4.4, the provisions of these Instructions do not apply to the following when carried by passengers or crew members or in baggage that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage) or in excess baggage carried as cargo as permitted by 1;1.1.3.1 g):

. . .

Medical necessities

. . .

a) with the approval of the operator(s), small gaseous oxygen or air cylinders required for medical use. Each cylinder must not exceed 5 kg gross mass. Cylinders, valves and regulators, where fitted, must be protected from damage which could cause inadvertent release of the contents. The pilot-in-command must be informed of the number of oxygen or air cylinders loaded on board the aircraft and their loading location(s);

Note.— Devices containing liquid oxygen are forbidden as or in carry-on baggage, checked baggage or on the person.

. . .

Editorial Note.— Additional proposed amendments to the provisions for medical necessities carried by passengers and crew, which related to batteries,, are shown in Appendix D to the report on Agenda Item 5.

Consumer articles

. . .

Editorial Note.— Additional proposed amendments to the provisions for consumer articles carried by passengers and crew, which related to batteries, are shown in Appendix D to the report on Agenda Item 5.

Editorial Note.— Paragraphs are re-numbered below as a result of amendments proposed under Agenda Item 5 (see Appendix D to the report on Agenda Item 5)

t) fuel cells ~~systems~~ used to power portable electronic devices (for example cameras, cellular phones, laptop computers and camcorders) and spare fuel cell cartridges, under the following conditions:

1) fuel cells and fuel cell cartridges may only contain flammable liquids, corrosive substances, liquefied flammable gas, water reactive substances or hydrogen in metal hydride;

2) ~~fuel cell cartridges must not be refillable by the user. R~~refuelling of fuel cells ~~systems~~ on board an aircraft is not permitted except that the installation of a spare cartridge is allowed. ~~Fuel cell cartridges which are used to refill fuel cell systems but which are not designed or intended to remain installed (fuel cell refills) are not permitted to be carried~~;

3) the maximum quantity of fuel in any fuel cell or fuel cell cartridge must not exceed:

a) for liquids 200 mL;

b) for solids 200 grams;

c) for liquefied gases, 120 mL for non-metallic fuel cells or fuel cell cartridges or 200 mL for metal fuel cells or fuel cell cartridges;

For hydrogen in metal hydride, the fuel cell cartridges must have a water capacity of 120 mL or less;

4) each fuel cell ~~system~~ and each fuel cell cartridge must conform to IEC PAS 62282-6-1 Ed. 1, and must be marked with a manufacturer's certification that it conforms to the specification. In addition, each fuel cell cartridge must be marked with the maximum quantity and type of fuel in the cartridge;

5) fuel cell cartridges containing hydrogen in metal hydride must comply with the requirements in Special Provision A162.

6) no more than two spare fuel cell cartridges may be carried by a passenger as follows:

a) fuel cell cartridges containing flammable liquids, corrosive substances, liquefied flammable gas or hydrogen in metal hydride in carry-on baggage, in checked baggage or on the person; and

b) fuel cell cartridges containing water reactive substances in carry-on baggage or on the person;

7) fuel cells ~~systems~~ containing fuel ~~and fuel cell cartridges including spare cartridges~~ are permitted in carry-on baggage only;

8) interaction between fuel cells and integrated batteries in a device must conform to IEC PAS 62282-6-1 Ed. 1. Fuel cells ~~systems~~ whose sole function is to charge a battery in the device are not permitted;

9) fuel cells ~~systems~~ must be of a type that will not charge batteries when the portable electronic device is not in use and must be durably marked by the manufacturer: "APPROVED FOR CARRIAGE IN AIRCRAFT CABIN ONLY" to so indicate; and

10) in addition to the languages which may be required by the State of Origin for the markings specified above, English should be used.

x) Energy efficient light bulbs when in retail packaging intended for personal or home use.

Security-type equipment

z) With the approval of the operator(s), security type equipment such as attaché cases, cash boxes, cash bags, etc. incorporating dangerous goods as part of this equipment, for example lithium batteries or pyrotechnic material, may be carried as checked baggage only if the equipment complies with the following:

1) the equipment must be equipped with an effective means of preventing accidental activation;

2) if the equipment contains an explosive or pyrotechnic substance or an explosive article, this article or substance must be excluded from Class 1 by the appropriate national authority of the State of Manufacture in compliance with Part 2;1.5.2.1;

3) if the equipment contains lithium cells or batteries, these cells or batteries must comply with the following restrictions:

a) for a lithium metal cell, the lithium content is not more than 1 g;

b) for a lithium metal or [lithium alloy] battery, the aggregate lithium content is not more than 2 g;

c) for lithium ion cells, the Watt-hour rating (see Attachment 2) is not more than 20 Wh;

d) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;

e) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3;

4) if the equipment contains gases to expel dye or ink, only gas cartridges and receptacles, small, containing gas with a capacity not exceeding 50 mL, containing no constituents subject to these Instructions other than a Division 2.2 gas, are allowed. The release of gas must not cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties. In case of accidental activation all hazardous effects must be confined within the equipment and must not produce extreme noise.

5) security type equipment that is defective or that has been damaged is forbidden for transport.

1.1.3 Any organization or enterprise other than an operator (such as a travel agent), involved in the air transport of passengers, should provide passengers with information about the types of dangerous goods which they are forbidden to transport aboard an aircraft. This information should consist of, as a minimum, notices at those locations where there is an interface with the passengers.

1.1.4 Where provision is made for the purchase of tickets via the Internet, information on the types of dangerous goods which a passenger is forbidden to transport aboard an aircraft should be provided in either text or pictorial form and should be such that ticket purchase cannot be completed until the passenger, or a person acting on their behalf, have indicated that they have understood the restrictions on dangerous goods in baggage.

. . .

Attachment 2

GLOSSARY OF TERMS

. . .

Glossary of terms

Term and explanation	*UN Number(s), when relevant*
CONVEYANCE. A conveyance is a means of transportation such as an aircraft, boat, road vehicle, scooter or lift truck.	
. . .	
FUEL CELL. An electrochemical device that converts the chemical energy of a fuel to electrical energy, heat and reaction products.	
FUEL CELL CARTRIDGE. 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.	3473, 3476, 3477, 3478, 3479
FUEL CELL ENGINE. A device used to power equipment and which consists of a fuel cell and its fuel supply, whether integrated with or separate from the fuel cell, and includes all appurtenances necessary to fulfil its function.	3166
. . .	
SECURITY TYPE EQUIPMENT. Equipment such as attaché cases, cash boxes, cash bags, etc., incorporating dangerous goods, for example lithium batteries, gas cartridges and/or pyrotechnic material.	

— — — — — — — —

ATTACHMENT A

PROPOSED AMENDMENTS TO TABLE 3-1 — UN NUMBER ORDER

The format for displaying the amendments to Table 3-1 is as follows:

Modified entries

- both the original and the modified entry are printed;
- both modified and non-modified fields are printed;
- the original entry is printed in a shaded box with an asterisk in the left margin;
- check boxes are printed above the field(s) which have been modified;
- the modified entry is shown without shading below the original entry; and
- the "≠" symbol is printed in the left margin.

Deleted entries

- deleted entries are displayed in a shaded box with an asterisk in the left margin;
- check boxes are shown above each field; and
- the ">" symbol is displayed in the left margin below the shaded box to indicate that the entry will be deleted.

New entries

New entries are shown without shading with the "+" symbol in the left margin.

Editorial Note.— Column 5 (Labels) is left blank in the proposed amendments to Table 3-1. The values, which are based on those in Columns 3 (Class or Division) and 4 (Subsidiary Risk), will appear in the published edition.

Table 3-1. Dangerous Goods List

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑						☑						
*	Security type equipment such as attaché cases incorporating cash boxes, cash bags, dangerous goods, for example lithium batteries or pyrotechnic material	FORBIDDEN											
≠	Security type equipment	FORBIDDEN					A178						
							☑						
*	**Charges, shaped** without detonator †	0059	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3	A109			FORBIDDEN		FORBIDDEN	
≠	**Charges, shaped** without detonator †	0059	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3				FORBIDDEN		FORBIDDEN	
							☑						
*	**Cord, detonating**, flexible †	0065	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3	A109			FORBIDDEN		FORBIDDEN	
≠	**Cord, detonating**, flexible †	0065	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3				FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑						☑						
*	**Fracturing devices, explosive**, without detonator for oil wells†	0099	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3	A109			FORBIDDEN		FORBIDDEN	
≠	**Fracturing devices, explosive**, without detonator for oil wells †	0099	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3				FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0350	1.4B				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0350	1.4B				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0354	1.1L				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0354	1.1L				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0355	1.2L				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0355	1.2L				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0356	1.3L				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0356	1.3L				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0462	1.1C				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0462	1.1C				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0463	1.1D				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0463	1.1D				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0464	1.1E				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0464	1.1E				A62			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Articles, explosive, n.o.s.***	0465	1.1F				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0465	1.1F				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0466	1.2C				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0466	1.2C				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0467	1.2D				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0467	1.2D				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0468	1.2E				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0468	1.2E				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0469	1.2F				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0469	1.2F				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0470	1.3C				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0470	1.3C				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, extremely insensitive †**	0486	1.6N				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, extremely insensitive †**	0486	1.6N				A62			FORBIDDEN		FORBIDDEN	
+	**Powder, smokeless †**	0509	1.4C		Explosive 1.4					FORBIDDEN		114	75 kg
*	**Air, compressed**	1002	2.2				☑ A124		E1	200	75 kg	200	150 kg
≠	**Air, compressed**	1002	2.2						E1	200	75 kg	200	150 kg
*	**Oxygen, compressed**	1072	2.2	5.1		US 18	☑		E0	200	75 kg	200	150 kg
≠	**Oxygen, compressed**	1072	2.2	5.1		US 18	A175		E0	200	75 kg	200	150 kg
*	**Dimethyldichlorosilane**	1162	3	8				II	E2	☑ 305	1 L	☑ 307	5 L
≠	**Dimethyldichlorosilane**	1162	3	8				II	E2	352	1 L	377	5 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Ethanol**	1170	3				☑ A3 A58	II III	E2 E1	☑ 305 Y305 309 Y309	 5 L 1 L 60 L 10 L	☑ 307 310	 60 L 220 L
≠	**Ethanol**	1170	3				A3 A58 A180	II III	E2 E1	353 Y341 355 Y344	5 L 1 L 60 L 10 L	364 366	60 L 220 L
*	**Ethyltrichlorosilane**	1196	3	8				II	E2	☑ 306	 1 L	☑ 304	 5 L
≠	**Ethyltrichlorosilane**	1196	3	8				II	E2	352	1 L	377	5 L
*	**Formaldehyde solution, flammable**	1198	3	8			☑	III	E1	☑ 309 Y309	 5 L 1 L	☑ 310	 60 L
≠	**Formaldehyde solution, flammable**	1198	3	8			A180	III	E1	354 Y342	5 L 1 L	365	60 L
*	**Isopropanol**	1219	3				☑	II	E2	☑ 305 Y305	 5 L 1 L	☑ 307	 60 L
≠	**Isopropanol**	1219	3				A180	II	E2	353 Y341	5 L 1 L	364	60 L
*	**Methyltrichlorosilane**	1250	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	☑ 306	 1 L	☑ 304	 5 L
≠	**Methyltrichlorosilane**	1250	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	352	1 L	377	5 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑			☑		☑	
*	**Perfumery products** with flammable solvents	1266	3				A3	II	E2	305 Y305	5 L 1 L	307	60 L
								III	E1	309 Y309	60 L 10 L	310	220 L
≠	**Perfumery products** with flammable solvents	1266	3				A3 A72	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
							☑			☑		☑	
*	**Petroleum crude oil**	1267	3				A3	I	E3	302	1 L	303	30 L
								II	E2	305 Y305	5 L 1 L	307	60 L
								III	E1	309 Y309	60 L 10 L	310	220 L
≠	**Petroleum crude oil**	1267	3				A3 A177	I	E3	351	1 L	361	30 L
								II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
										☑		☑	
*	**Trimethylchlorosilane**	1298	3	8				II	E2	306	1 L	304	5 L
≠	**Trimethylchlorosilane**	1298	3	8				II	E2	352	1 L	377	5 L
										☑		☑	
*	**Vinyltrichlorosilane**	1305	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	306	1 L	304	5 L
≠	**Vinyltrichlorosilane**	1305	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	352	1 L	377	5 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	☑ **Metal catalyst, wetted** with a visible excess of liquid	1378	4.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		☑ 416	50 kg
≠	**Metal catalyst, wetted*** with a visible excess of liquid	1378	4.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		473	50 kg
*	**Alkali metal dispersion**	1391	4.3				☑ A84 A147	I	E0	FORBIDDEN		☑ 409	1 L
≠	**Alkali metal dispersion**	1391	4.3				A84	I	E0	FORBIDDEN		480	1 L
*	**Alkaline earth metal dispersion**	1391	4.3				☑ A85 A147	I	E0	FORBIDDEN		☑ 409	1 L
≠	**Alkaline earth metal dispersion**	1391	4.3				A85	I	E0	FORBIDDEN		480	1 L
*	☑ **Bromates, inorganic, n.o.s.**	1450	5.1				☑	II	E2	☑ 508 Y508	5 kg 2.5 kg	☑ 511	25 kg
≠	**Bromates, inorganic, n.o.s.***	1450	5.1				A170	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
*	☑ **Chlorates, inorganic, n.o.s.**	1461	5.1				☑	II	E2	☑ 509 Y509	5 kg 2.5 kg	☑ 512	25 kg
≠	**Chlorates, inorganic, n.o.s.***	1461	5.1				A171	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
*	☑ **Chlorites, inorganic, n.o.s.**	1462	5.1				☑	II	E2	☑ 509 Y509	5 kg 2.5 kg	☑ 512	25 kg
≠	**Chlorites, inorganic, n.o.s.***	1462	5.1				A172	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
*	**Lithium hypochlorite, dry**	1471	5.1				☑	☑ II	☑ E2	☑ 509 Y509	☑ 5 kg 2.5 kg	☑ 512	☑ 25 kg
≠	**Lithium hypochlorite, dry**	1471	5.1				A3	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑	☑	☑	☑	☑	☑	☑
*	**Lithium hypochlorite mixture**	1471	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Lithium hypochlorite mixture**	1471	5.1				A3	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
								III	E1	559 Y546	25 kg 10 kg	563	100 kg
	☑						☑			☑		☑	
*	**Permanganates, inorganic, n.o.s.**	1482	5.1				A3 A37	II	E2	508 Y508	5 kg 2.5 kg	511	25 kg
								III	E1	516 Y516	25 kg 10 kg	518	100 kg
≠	**Permanganates, inorganic, n.o.s.***	1482	5.1				A3 A37 A173	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
								III	E1	559 Y546	25 kg 10 kg	563	100 kg
			☑	☑									
*	**Tetranitromethane**	1510	5.1	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Tetranitromethane**	1510	6.1	5.1				I		FORBIDDEN		FORBIDDEN	
	☑									☑		☑	
*	**Antimony compound, inorganic, solid, n.o.s.**	1549	6.1				A12	III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Antimony compound, inorganic, solid, n.o.s.***	1549	6.1				A12	III	E1	670 Y645	100 kg 10 kg	677	200 kg
	☑									☑		☑	
*	**Arsenic compound, liquid, n.o.s.**, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1556	6.1				A3 A4 A6	I II	E5 E4	603 609 Y609	1 L 5 L 1 L	604 611	30 L 60 L
								III	E1	611 Y611	60 L 2 L	618	220 L
≠	**Arsenic compound, liquid, n.o.s.***, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1556	6.1				A3 A4 A6	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Arsenic compound, solid, n.o.s.**, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1557	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Arsenic compound, solid, n.o.s.***, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1557	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
	☑									☑		☑	
*	**Barium compound, n.o.s.**	1564	6.1				A3 A82	II III	E4 E1	613 Y613 619 Y619	25 kg 1 kg 100 kg 10 kg	615 619	100 kg 200 kg
≠	**Barium compound, n.o.s.***	1564	6.1				A3 A82	II III	E4 E1	669 Y644 670 Y645	25 kg 1 kg 100 kg 10 kg	676 677	100 kg 200 kg
	☑									☑		☑	
*	**Beryllium compound, n.o.s.**	1566	6.1			US 4	A3	II III	E4 E1	613 Y613 619 Y619	25 kg 1 kg 100 kg 10 kg	615 619	100 kg 200 kg
≠	**Beryllium compound, n.o.s.***	1566	6.1			US 4	A3	II III	E4 E1	669 Y644 670 Y645	25 kg 1 kg 100 kg 10 kg	676 677	100 kg 200 kg
	☑												
*	**Chloropicrin mixture, n.o.s.**	1583	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2 A3 A137	I		FORBIDDEN		FORBIDDEN	
≠	**Chloropicrin mixture, n.o.s.***	1583	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2 A3 A137	I		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑					☑	
*	**Motor fuel anti-knock mixture**	1649	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A147	I	E0	FORBIDDEN		605	30 L
≠	**Motor fuel anti-knock mixture**	1649	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		658	30 L
	☑									☑		☑	
*	**Nicotine compound, solid, n.o.s.**	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Nicotine compound, solid, n.o.s.***	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
	☑									☑		☑	
*	**Nicotine preparation, solid, n.o.s.**	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Nicotine preparation, solid, n.o.s.***	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Allyltrichlorosilane, stabilized**	1724	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Allyltrichlorosilane, stabilized**	1724	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Amyltrichlorosilane**	1728	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Amyltrichlorosilane**	1728	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Butyltrichlorosilane**	1747	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Butyltrichlorosilane**	1747	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑			☑		☑	
*	**Calcium hypochlorite, dry**	1748	5.1			US 4	A135 A136	II III	E2 E1	509 Y509 517 Y517	5 kg 2.5 kg 25 kg 10 kg	512 519	25 kg 100 kg
≠	**Calcium hypochlorite, dry**	1748	5.1			US 4	A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
												☑	
*	**Chlorophenyltrichlorosilane**	1753	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Chlorophenyltrichlorosilane**	1753	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
												☑	
*	**Cyclohexenyltrichlorosilane**	1762	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Cyclohexenyltrichlorosilane**	1762	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Cyclohexyltrichlorosilane**	1763	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813 ☑	30 L
≠	**Cyclohexyltrichlorosilane**	1763	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Dichlorophenyltrichlorosilane**	1766	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813 ☑	30 L
≠	**Dichlorophenyltrichlorosilane**	1766	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Diethyldichlorosilane**	1767	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813 ☑	30 L
≠	**Diethyldichlorosilane**	1767	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Diphenyldichlorosilane**	1769	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Diphenyldichlorosilane**	1769	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Dodecyltrichlorosilane**	1771	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Dodecyltrichlorosilane**	1771	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Hexadecyltrichlorosilane**	1781	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Hexadecyltrichlorosilane**	1781	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Hexyltrichlorosilane**	1784	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Hexyltrichlorosilane**	1784	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Nonyltrichlorosilane**	1799	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Nonyltrichlorosilane**	1799	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Octadecyltrichlorosilane**	1800	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Octadecyltrichlorosilane**	1800	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Octyltrichlorosilane**	1801	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Octyltrichlorosilane**	1801	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Phenyltrichlorosilane**	1804	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Phenyltrichlorosilane**	1804	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Phosphorus oxychloride**	1810	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Phosphorus oxychloride**	1810	6.1	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Propyltrichlorosilane**	1816	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Propyltrichlorosilane**	1816	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Silicon tetrachloride**	1818	8				☑	☑	☑	☑ 809 Y809	☑ 1 L 0.5 L	☑ 813	☑ 30 L
≠	**Silicon tetrachloride**	1818	8				A1	II	E0	FORBIDDEN		876	30 L
*	**Sulphuryl chloride**	1834	☑ 8	☑				I		FORBIDDEN		FORBIDDEN	
≠	**Sulphuryl chloride**	1834	6.1	8				I		FORBIDDEN		FORBIDDEN	
*	**Titanium tetrachloride**	1838	☑ 8	☑		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Titanium tetrachloride**	1838	6.1	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
*	**Carbon dioxide, solid**	1845	9				A48 A151	☑ III	E0	☑ 904	200 kg	☑ 904	200 kg
≠	**Carbon dioxide, solid**	1845	9				A48 A151		E0	954	200 kg	954	200 kg
*	**Dry ice**	1845	9				A48 A151	☑ III	E0	☑ 904	200 kg	☑ 904	200 kg
≠	**Dry ice**	1845	9				A48 A151		E0	954	200 kg	954	200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Cyanide solution, n.o.s.**	1935	6.1				A3	I II III	E5 E4 E1	610 617 Y617 612 Y612	1 L 5 L 1 L 60 L 2 L	605 612 620	30 L 60 L 220 L
≠	**Cyanide solution, n.o.s.***	1935	6.1				A3	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 661 663	30 L 60 L 220 L
							☑						
*	**Aerosols**, flammable	1950	2.1				A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable	1950	2.1				A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
							☑						
*	**Aerosols**, flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.1	8			A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.1	8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
							☑						
*	**Aerosols**, flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.1	6.1			A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.1	6.1			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
							☑						
*	**Aerosols**, flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.1	6.1 8			A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.1	6.1 8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Aerosols**, flammable (engine starting fluid)	1950	2.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A145 A153		E0	FORBIDDEN		203	150 kg
≠	**Aerosols**, flammable (engine starting fluid)	1950	2.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		203	150 kg
*	**Aerosols**, non-flammable	1950	2.2				☑ A98 A145 A153		E0	203 or 204 Y203 or Y204	75 kg 30 kg G	203 or 204	150 kg
≠	**Aerosols**, non-flammable	1950	2.2				A98 A145 A167		E0	203 or 204 Y203 or Y204	75 kg 30 kg G	203 or 204	150 kg
*	**Aerosols**, non-flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.2	8			☑ A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, non-flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.2	8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, non-flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.2	6.1			☑ A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, non-flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.2	6.1			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, non-flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.2	6.1 8			☑ A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, non-flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.2	6.1 8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A145 A153		E0	FORBIDDEN		212	50 kg
≠	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		212	50 kg
*	**Aerosols**, oxidizing	1950	2.2	5.1			☑ A145 A153		E0	203	75 kg	203	150 kg
≠	**Aerosols**, oxidizing	1950	2.2	5.1			A145 A167		E0	203	75 kg	203	150 kg
*	**Compressed gas, n.o.s.***	1956	2.2				☑ A124		E1	200	75 kg	200	150 kg
≠	**Compressed gas, n.o.s.***	1956	2.2						E1	200	75 kg	200	150 kg
*	**Nitrogen, refrigerated liquid**	1977	2.2				☑ A152		E1	202	50 kg	202	500 kg
≠	**Nitrogen, refrigerated liquid**	1977	2.2				A152 A168		E1	202	50 kg	202	500 kg
*	**Alcohols, n.o.s.***	1987	3				☑ A3	II III	E2 E1	☑ 305 Y305 309 Y309	 5 L 1 L 60 L 10 L	☑ 307 310	 60 L 220 L
≠	**Alcohols, n.o.s.***	1987	3				A3 A180	II III	E2 E1	353 Y341 355 Y344	5 L 1 L 60 L 10 L	364 366	60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Tars, liquid**, including road asphalt and oils, bitumen and cut backs	1999	3				A3	II	E2	305 Y305	5 L 1 L	307	60 L
								III	E1	309 Y309	60 L 10 L	310	220 L
≠	**Tars, liquid**, including road oils, and cutback bitumens	1999	3				A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	☑									☑		☑	
*	**Mercury compound, liquid, n.o.s.**	2024	6.1				A3 A4 A6 A18	I II III	E5 E4 E1	610 617 Y617 612 Y612	1 L 5 L 1 L 60 L 2 L	605 612 620	30 L 60 L 220 L
≠	**Mercury compound, liquid, n.o.s.***	2024	6.1				A3 A4 A6 A18	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 661 663	30 L 60 L 220 L
	☑									☑		☑	
*	**Mercury compound, solid, n.o.s.**	2025	6.1				A3 A5 A6 A18	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Mercury compound, solid, n.o.s.***	2025	6.1				A3 A5 A6 A18	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
	☑									☑		☑	
*	**Phenylmercuric compound, n.o.s.**	2026	6.1				A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Phenylmercuric compound, n.o.s.***	2026	6.1				A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Hydrazine, aqueous solution** with more than 37% hydrazine by mass	2030	8	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A36 A147	I II III	E0 E0 E1	FORBIDDEN FORBIDDEN 818 Y818	 5 L 1 L	809 812 820	2.5 L 30 L 60 L
≠	**Hydrazine, aqueous solution** with more than 37% hydrazine by mass	2030	8	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A36	I II III	E0 E0 E1	FORBIDDEN FORBIDDEN 852 Y841	 5 L 1 L	854 855 856	2.5 L 30 L 60 L
*	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1						E0	203 Y203	1 kg 1 kg	203	15 kg
≠	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1				A167		E0	203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2				A98		E0	203 Y203	1 kg 1 kg	203	15 kg
≠	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2				A98 A167		E0	203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1					E0	203	1 kg	203	15 kg
≠	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1			A167		E0	203	1 kg	203	15 kg
*	**Calcium hypochlorite mixture, dry** with more than 10% but not more than 39% available chlorine	2208	5.1			US 4	A135 A136	III	E1	517 Y517	25 kg 10 kg	519	100 kg
≠	**Calcium hypochlorite mixture, dry** with more than 10% but not more than 39% available chlorine	2208	5.1			US 4	A136	III	E1	559 Y546	25 kg 10 kg	563	100 kg
*	**Lead compound, soluble, n.o.s.**	2291	6.1				A92	III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Lead compound, soluble, n.o.s.***	2291	6.1				A92	III	E1	670 Y645	100 kg 10 kg	677	200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Dibenzyldichlorosilane**	2434	8					II	E2	808 Y808	1 L 0.5 L	812	30 L
≠	**Dibenzyldichlorosilane**	2434	8				A1	II	E2	FORBIDDEN		876	30 L
*	**Ethylphenyldichlorosilane**	2435	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Ethylphenyldichlorosilane**	2435	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Methylphenyldichlorosilane**	2437	8					II	E2	808	1 L	812	30 L
≠	**Methylphenyldichlorosilane**	2437	8				A1	II	E2	FORBIDDEN		876	30 L
*	**Ethyl isocyanate**	2481	3	6.1		US 2		I	E0	FORBIDDEN		304	30 L
≠	**Ethyl isocyanate**	2481	6.1	3		US 2		I		FORBIDDEN		FORBIDDEN	
*	**Isopropyl isocyanate**	2483	3	6.1						FORBIDDEN		FORBIDDEN	
≠	**Isopropyl isocyanate**	2483	6.1	3						FORBIDDEN		FORBIDDEN	
*	**Isobutyl isocyanate**	2486	3	6.1		US 2		II	E2	306 Y306	1 L 1 L	308	60 L
≠	**Isobutyl isocyanate**	2486	6.1	3		US 2				FORBIDDEN		FORBIDDEN	
*	**Cadmium compound**	2570	6.1			US 4	A3 A5	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Cadmium compound***	2570	6.1			US 4	A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Methoxymethyl isocyanate**	2605	3	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Methoxymethyl isocyanate**	2605	6.1	3				I		FORBIDDEN		FORBIDDEN	
*	**Nitrites, inorganic, n.o.s.**	2627	5.1				A33	II	E2	508 Y508	5 kg 2.5 kg	511	25 kg
≠	**Nitrites, inorganic, n.o.s.***	2627	5.1				A33	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
*	**Selenates**	2630	6.1			US 4		I	E5	606	5 kg	607	50 kg
≠	**Selenates***	2630	6.1			US 4		I	E5	666	5 kg	673	50 kg
*	**Selenites**	2630	6.1			US 4		I	E5	606	5 kg	607	50 kg
≠	**Selenites***	2630	6.1			US 4		I	E5	666	5 kg	673	50 kg
*	**Chloroformates, toxic, corrosive, flammable, n.o.s.**	2742	6.1	3 8				II	E4	609 Y609	1 L 0.5 L	611	30 L
≠	**Chloroformates, toxic, corrosive, flammable, n.o.s.***	2742	6.1	3 8				II	E4	653 Y640	1 L 0.5 L	660	30 L
*	**Batteries, wet, filled with acid**, electric storage †	2794	8				A51 A164		E0	800	30 kg G	800	No limit
≠	**Batteries, wet, filled with acid**, electric storage †	2794	8				A51 A164 A183		E0	800	30 kg G	800	No limit
*	**Batteries, wet, filled with alkali**, electric storage †	2795	8				A51 A164		E0	800	30 kg G	800	No limit
≠	**Batteries, wet, filled with alkali**, electric storage †	2795	8				A51 A164 A183		E0	800	30 kg G	800	No limit

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Batteries, wet, non-spillable**, electric storage	2800	8				A48 A67 A164		E0	806	No limit	806	No limit
≠	**Batteries, wet, non-spillable**, electric storage	2800	8				A48 A67 A164 A183		E0	806	No limit	806	No limit
*	**Infectious substance, affecting humans**	2814	6.2			AU 3 CA 5 CA 11 GB 5 VU 2	A81 A140		E0	602	50 mL or 50 g	602	4 L or 4 kg
≠	**Infectious substance, affecting humans**	2814	6.2			AU 3 CA 5 CA 11 GB 5 VU 2	A81 A140		E0	620	50 mL or 50 g	620	4 L or 4 kg
*	**Fluorosilicates, n.o.s.**	2856	6.1					III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Fluorosilicates, n.o.s.***	2856	6.1					III	E1	670 Y645	100 kg 10 kg	677	200 kg
*	**Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A135 A136	II III	E2 E1	508 Y508 516 Y516	5 kg 2.5 kg 25 kg 10 kg	511 518	25 kg 100 kg
≠	**Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑			☑		☑	
*	**Calcium hypochlorite, hydrated mixture** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A135 A136	II III	E2 E1	508 Y508 516 Y516	5 kg 2.5 kg 25 kg 10 kg	511 518	25 kg 100 kg
≠	**Calcium hypochlorite, hydrated mixture** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
	☑									☑		☑	
*	**Metal catalyst, dry**	2881	4.2				A3 A36	I II III	 E0 E1	FORBIDDEN FORBIDDEN 422	 25 kg	FORBIDDEN 416 421	 50 kg 100 kg
≠	**Metal catalyst, dry***	2881	4.2				A3 A36	I II III	 E0 E1	FORBIDDEN FORBIDDEN 473	 25 kg	FORBIDDEN 473 473	 50 kg 100 kg
										☑		☑	
*	**Infectious substance, affecting animals** only	2900	6.2			AU 3 CA 5 CA 10 GB 5 VU 2	A81 A140		E0	602	50 mL or 50 g	602	4 L or 4 kg
≠	**Infectious substance, affecting animals** only	2900	6.2			AU 3 CA 5 CA 10 GB 5 VU 2	A81 A140		E0	620	50 mL or 50 g	620	4 L or 4 kg
							☑						
*	**Radioactive material, excepted package — limited quantity of material**	2910	7				A130				See Part 2;7		
≠	**Radioactive material, excepted package — limited quantity of material**	2910	7				A23 A130				See Part 1;6		

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Radioactive material, Type B(U) package**, non-fissile or fissile excepted	2916	7			CA 1	☑ A78 A139 A160			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type B(U) package**, non-fissile or fissile excepted	2916	7			CA 1	A23 A78 A139 A160			See Part 2;7 and Part 4;9			
*	**Radioactive material, Type B(M) package**, non-fissile or fissile excepted	2917	7			CA 1	☑ A78 A139 A160			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type B(M) package**, non-fissile or fissile excepted	2917	7			CA 1	A23 A78 A139 A160			See Part 2;7 and Part 4;9			
*	**Radioactive material, transported under special arrangement**, non-fissile or fissile excepted	2919	7			CA 1	☑ A78 A139			See Part 2;7 and Part 4;9			
≠	**Radioactive material, transported under special arrangement**, non-fissile or fissile excepted	2919	7			CA 1	A23 A78 A139			See Part 2;7 and Part 4;9			
*	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8				II	E2	☑ 305	1 L	☑ 307	5 L
≠	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8				II	E2	352	1 L	377	5 L
*	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3			☑	II	☑ E2	☑ 808	☑ 1 L	☑ 812	30 L
≠	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3			A1	II	E0	FORBIDDEN		876	30 L
*	**Chlorosilanes, corrosive, n.o.s.**	2987	8				☑	II	☑ E2	☑ 808	☑ 1 L	☑ 812	30 L
≠	**Chlorosilanes, corrosive, n.o.s.**	2987	8				A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Batteries, dry, containing potassium hydroxide solid**, electric storage †	3028	8				☑		E0	802	25 kg G	802	230 kg G
≠	**Batteries, dry, containing potassium hydroxide solid**, electric storage †	3028	8				A183		E0	802	25 kg G	802	230 kg G
*	**Methacrylonitrile, stabilized**	3079	☑ 3	☑ 6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Methacrylonitrile, stabilized**	3079	6.1	3				I		FORBIDDEN		FORBIDDEN	
*	**Lithium metal batteries** (including lithium alloy batteries)†	3090	9			US 2 US 3	☑ A88 A99 A154 A164	II	E0	968	2.5 kg G	968	35 kg G
≠	**Lithium metal batteries** (including lithium alloy batteries)†	3090	9			US 2 US 3	A88 A99 A154 A164 A183	II	E0	968	2.5 kg G	968	35 kg G
*	**Lithium metal batteries contained in equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	☑ A48 A154 A164	II	E0	see 970		see 970	
≠	**Lithium metal batteries contained in equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	A48 A99 A154 A164 A181	II	E0	see 970		see 970	
*	**Lithium metal batteries packed with equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	☑ A154 A164	II	E0	see 969		see 969	
≠	**Lithium metal batteries packed with equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	A154 A164 A181	II	E0	see 969		see 969	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Organic peroxide type C, liquid***	3103	5.2				☑ A14 A20 A150		E0	500	5 L	502	10 L
≠	**Organic peroxide type C, liquid***	3103	5.2				A20 A150		E0	500	5 L	502	10 L
*	**Organic peroxide type C, solid***	3104	5.2				☑ A14 A20 A150		E0	510	5 kg	513	10 kg
≠	**Organic peroxide type C, solid***	3104	5.2				A20 A150		E0	510	5 kg	513	10 kg
*	**Organic peroxide type D, liquid***	3105	5.2				☑ A14 A20 A150		E0	500	5 L	502	10 L
≠	**Organic peroxide type D, liquid***	3105	5.2				A20 A150		E0	500	5 L	502	10 L
*	**Organic peroxide type D, solid***	3106	5.2				☑ A14 A20		E0	510	5 kg	513	10 kg
≠	**Organic peroxide type D, solid***	3106	5.2				A20		E0	510	5 kg	513	10 kg
*	**Organic peroxide type E, liquid***	3107	5.2				☑ A14 A20 A150		E0	500	10 L	502	25 L
≠	**Organic peroxide type E, liquid***	3107	5.2				A20 A150		E0	500	10 L	502	25 L
*	**Organic peroxide type E, solid***	3108	5.2				☑ A14 A20		E0	510	10 kg	513	25 kg
≠	**Organic peroxide type E, solid***	3108	5.2				A20		E0	510	10 kg	513	25 kg
*	**Organic peroxide type F, liquid***	3109	5.2				☑ A14 A20 A150		E0	500	10 L	502	25 L
≠	**Organic peroxide type F, liquid***	3109	5.2				A20 A150		E0	500	10 L	502	25 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Organic peroxide type F, solid***	3110	5.2				A14 A20		E0	510	10 kg	513	25 kg
≠	**Organic peroxide type F, solid***	3110	5.2				A20		E0	510	10 kg	513	25 kg
*	**Antimony compound, inorganic, liquid, n.o.s.**	3141	6.1				A12	III	E1	611 Y611	60 L 2 L	618	220 L
≠	**Antimony compound, inorganic, liquid, n.o.s.***	3141	6.1				A12	III	E1	655 Y642	60 L 2 L	663	220 L
*	**Nicotine compound, liquid, n.o.s.**	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Nicotine compound, liquid, n.o.s.***	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
*	**Nicotine preparation, liquid, n.o.s.**	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Nicotine preparation, liquid, n.o.s.***	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
*	**Engines, internal combustion, flammable gas powered**	3166	9				A67 A70 A87 A134		E0	FORBIDDEN		900	No limit
≠	**Engine, internal combustion, flammable gas powered**	3166	9				A67 A70 A87 A134		E0	FORBIDDEN		951	No limit

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Engines, internal combustion, flammable liquid powered**	3166	9				A67 A70 A87 A134		E0	900	No limit	900	No limit
≠	**Engine, internal combustion, flammable liquid powered**	3166	9				A67 A70 A87 A134		E0	950	No limit	950	No limit
+	**Engine, fuel cell, flammable gas powered †**	3166	9				A67 A70 A87 A134 A176		E0	FORBIDDEN		951	No limit
+	**Engine, fuel cell, flammable liquid powered †**	3166	9				A67 A70 A87 A134 A176		E0	950	No limit	950	No limit
+	**Vehicle, fuel cell, flammable gas powered †**	3166	9				A67 A70 A87 A118 A120 A134 A176		E0	FORBIDDEN		951	No limit
+	**Vehicle, fuel cell, flammable liquid powered †**	3166	9				A67 A70 A87 A118 A120 A134 A176		E0	950	No limit	950	No limit
							☑			☑		☑	
*	**Battery-powered equipment**	3171	9				A21 A67 A87 A94 A164		E0	900	No limit	900	No limit
≠	**Battery-powered equipment**	3171	9				A21 A67 A87 A94 A164 A182		E0	952	No limit	952	No limit

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
☑							☑			☑		☑	
*	**Chlorates, inorganic, aqueous solution, n.o.s.**	3210	5.1				A3	II III	E2 E1	501 Y501 506 Y506	1 L 0.5 L 2.5 L 1 L	506 507	5 L 30 L
≠	**Chlorates, inorganic, aqueous solution, n.o.s.***	3210	5.1				A3 A171	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
☑							☑			☑		☑	
*	**Hypochlorites, inorganic, n.o.s.**	3212	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Hypochlorites, inorganic, n.o.s.***	3212	5.1				A169	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
☑							☑			☑		☑	
*	**Bromates, inorganic, aqueous solution, n.o.s.**	3213	5.1				A3	II III	E2 E1	503 Y503 514 Y514	1 L 0.5 L 2.5 L 1 L	505 515	5 L 30 L
≠	**Bromates, inorganic, aqueous solution, n.o.s.***	3213	5.1				A3 A170	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
☑							☑			☑		☑	
*	**Permanganates, inorganic, aqueous solution, n.o.s.**	3214	5.1				A37	II	E2	503 Y503	1 L 0.5 L	505	5 L
≠	**Permanganates, inorganic, aqueous solution, n.o.s.***	3214	5.1				A37 A173	II	E2	550 Y540	1 L 0.5 L	554	5 L
☑										☑		☑	
*	**Nitrites, inorganic, aqueous solution, n.o.s.**	3219	5.1				A3 A33	II III	E2 E1	503 Y503 514 Y514	1 L 0.5 L 2.5 L 1 L	505 515	5 L 30 L
≠	**Nitrites, inorganic, aqueous solution, n.o.s.***	3219	5.1				A3 A33	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑												
*	**Elevated temperature liquid, flammable, n.o.s.**, with flash point above 60°C, at or above its flash point	3256	3					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature liquid, flammable, n.o.s.***, with flash point above 60°C, at or above its flash point	3256	3					III		FORBIDDEN		FORBIDDEN	
	☑												
*	**Elevated temperature liquid, n.o.s.**, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	3257	9					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature liquid, n.o.s.***, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	3257	9					III		FORBIDDEN		FORBIDDEN	
	☑												
*	**Elevated temperature solid, n.o.s.**, at or above 240°C	3258	9					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature solid, n.o.s.***, at or above 240°C	3258	9					III		FORBIDDEN		FORBIDDEN	
	☑									☑		☑	
*	**Selenium compound, solid, n.o.s.**	3283	6.1				A3 A5	I II	E5 E4	606 613 Y613	5 kg 25 kg 1 kg	607 615	50 kg 100 kg
								III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Selenium compound, solid, n.o.s.***	3283	6.1				A3 A5	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
	☑									☑		☑	
*	**Tellurium compound, n.o.s.**	3284	6.1				A3 A5	I II	E5 E4	606 613 Y613	5 kg 25 kg 1 kg	607 615	50 kg 100 kg
								III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Tellurium compound, n.o.s.***	3284	6.1				A3 A5	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Vanadium compound, n.o.s.**	3285	6.1				A3 A5	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Vanadium compound, n.o.s.***	3285	6.1				A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
*	**Batteries, containing sodium †**	3292	4.3				☑ A94	II	E0	FORBIDDEN		☑ 433	No limit
≠	**Batteries, containing sodium †**	3292	4.3				A94 A183	II	E0	FORBIDDEN		492	No limit
*	**Radioactive material, Type C package**, non-fissile or fissile excepted	3323	7			CA 1	☑ A78 A139			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type C package**, non-fissile or fissile excepted	3323	7			CA 1	A23 A78 A139			See Part 2;7 and Part 4;9			
*	**Radioactive material, Type B(U) package, fissile**	3328	7			CA 1	☑ A78 A160			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type B(U) package, fissile**	3328	7			CA 1	A76 A78 A160			See Part 2;7 and Part 4;9			
*	**Radioactive material, Type B(M) package, fissile**	3329	7			CA 1	☑ A78 A160			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type B(M) package, fissile**	3329	7			CA 1	A76 A78 A160			See Part 2;7 and Part 4;9			
*	**Radioactive material, Type C package, fissile**	3330	7			CA 1	☑ A78			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type C package, fissile**	3330	7			CA 1	A76 A78			See Part 2;7 and Part 4;9			

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Radioactive material, transported under special arrangement, fissile**	3331	7			CA 1	A78			See Part 2;7 and Part 4;9			
≠	**Radioactive material, transported under special arrangement, fissile**	3331	7			CA 1	A76 A78			See Part 2;7 and Part 4;9			
*	**Aviation regulated liquid, n.o.s.***	3334	9				A27 A48		E0	906	No limit	906	No limit
≠	**Aviation regulated liquid, n.o.s.***	3334	9				A27 A48		E1	964	No limit	964	No limit
*	**Aviation regulated solid, n.o.s.***	3335	9				A27 A48		E0	906	No limit	906	No limit
≠	**Aviation regulated solid, n.o.s.***	3335	9				A27 A48		E1	956	No limit	956	No limit
*	**Oxygen generator, chemical** † (including when contained in associated equipment, e.g. passenger service units (PSUs), protective breathing equipment (PBE), etc.)	3356	5.1			AU 1 CA 7 FR 7 GB 3 IR 3 NL 1 US 3 US 18	A1 A111 A116 A144	II	E0	FORBIDDEN		523	25 kg G
≠	**Oxygen generator, chemical** † (including when contained in associated equipment, e.g. passenger service units (PSUs), protective breathing equipment (PBE), etc.)	3356	5.1			AU 1 CA 7 FR 7 GB 3 IR 3 NL 1 US 3 US 18	A1 A111 A116 A144	II	E0	FORBIDDEN		565	25 kg
*	**Chlorosilanes, toxic, corrosive, n.o.s.**	3361	6.1	8				II	E4	609	1 L	611	30 L
≠	**Chlorosilanes, toxic, corrosive, n.o.s.** *	3361	6.1	8				II	E4	681	1 L	681	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.**	3362	6.1	3 8				II	E4	609	1 L	611	30 L
≠	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.***	3362	6.1	3 8				II	E4	681	1 L	681	30 L
	☑									☑		☑	
*	**Selenium compound, liquid, n.o.s.**	3440	6.1				A3 A4	I II III	E5 E4 E1	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Selenium compound, liquid, n.o.s.***	3440	6.1				A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
							☑						
*	**Hydrogen in a metal hydride storage system**	3468	2.1				A1 A143		E0	FORBIDDEN		214	100 kg G
≠	**Hydrogen in a metal hydride storage system**	3468	2.1				A1 A143 A176		E0	FORBIDDEN		214	100 kg G
							☑						
*	**Hydrogen in a metal hydride storage system contained in equipment**	3468	2.1				A1 A143		E0	FORBIDDEN		214	100 kg G
≠	**Hydrogen in a metal hydride storage system contained in equipment**	3468	2.1				A1 A143 A176		E0	FORBIDDEN		214	100 kg G
							☑						
*	**Hydrogen in a metal hydride storage system packed with equipment**	3468	2.1				A1 A143		E0	FORBIDDEN		214	100 kg G
≠	**Hydrogen in a metal hydride storage system packed with equipment**	3468	2.1				A1 A143 A176		E0	FORBIDDEN		214	100 kg G
	☑							☑	☑	☑	☑	☑	☑
*	**Fuel cell cartridges**, containing flammable liquids	3473	3				A146		E0	374	5 kg	374	50 kg
≠	**Fuel cell cartridges**, containing flammable liquids †	3473	3				A146		E0	374 Y374	5 kg 2.5 kg	374	50 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	☑ **1-Hydroxybenzotriazole, anhydrous, wetted** with not less than 20% water, by mass	3474	4.1				☑ A40	I	E0	☑ 416	0.5 kg	☑ 416	0.5 kg
≠	**1-Hydroxybenzotriazole monohydrate**	3474	4.1					I	E0	451	0.5 kg	451	0.5 kg
*	☑ **Fuel cell cartridges**, containing water-reactive substances	3476	4.3				A146 A157	☑	☑ E0	☑ 495	☑ 5 kg	☑ 495	☑ 50 kg
≠	**Fuel cell cartridges**, containing water-reactive substances †	3476	4.3				A146 A157		E0	495 Y495	5 kg 2.5 kg	495	50 kg
*	☑ **Fuel cell cartridges**, containing corrosive substances	3477	8				A146 A157	☑	☑ E0	☑ 873	☑ 5 kg	☑ 873	☑ 50 kg
≠	**Fuel cell cartridges**, containing corrosive substances †	3477	8				A146 A157		E0	873 Y873	5 kg 2.5 kg	873	50 kg
*	☑ **Fuel cell cartridges**, containing liquefied flammable gas	3478	2.1				A146 A161	☑	☑ E0	☑ 215	☑ 1 kg	☑ 215	☑ 15 kg
≠	**Fuel cell cartridges**, containing liquefied flammable gas †	3478	2.1				A146 A161		E0	215 Y215	1 kg 0.5 kg	215	15 kg
*	☑ **Fuel cell cartridges**, containing hydrogen in metal hydride	3479	2.1				A146 A162	☑	☑ E0	☑ 215	☑ 1 kg	☑ 215	☑ 15 kg
≠	**Fuel cell cartridges**, containing hydrogen in metal hydride †	3479	2.1				A146 A162		E0	215 Y215	1 kg 0.5 kg	215	15 kg
*	**Lithium ion batteries** (including lithium ion polymer batteries)	3480	9				☑ A88 A99 A154 A164	II	E0	965	5 kg G	965	35 kg G
≠	**Lithium ion batteries** (including lithium ion polymer batteries)	3480	9				A88 A99 A154 A164 A183	II	E0	965	5 kg G	965	35 kg G

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)	3481	9				☑ A48 A154 A164	II	E0	see 967		see 967	
≠	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)	3481	9				A48 A99 A154 A164 A181	II	E0	see 967		see 967	
*	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)	3481	9				☑ A88 A154 A164	II	E0	see 966		see 966	
≠	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)	3481	9				A88 A154 A164 A181	II	E0	see 966		see 966	
+	**Alkali metal dispersion,**	3482	4.3	3			A84	I	E0	FORBIDDEN		480	1 L
+	**Alkaline earth metal dispersion, flammable**	3482	4.3	3			A85	I	E0	FORBIDDEN		480	1 L
+	**Motor fuel anti-knock mixture, flammable**	3483	6.1	3			A2			FORBIDDEN		FORBIDDEN	
+	**Hydrazine aqueous solution, flammable** with more than 37% hydrazine, by mass	3484	8	3 6.1			A1	I	E0	FORBIDDEN		854	2.5 L
+	**Calcium hypochlorite mixture, dry, corrosive** with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	8			A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
+	**Calcium hypochlorite, dry, corrosive** with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	8			A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
+	**Calcium hypochlorite mixture, dry, corrosive** with more than 10% but not more than 39% available chlorine	3486	5.1	8			A136	III	E1	559 Y545	25 kg 5 kg	563	100 kg
+	**Calcium hypochlorite, hydrated, corrosive** with not less than 5.5% but not more than 16% water	3487	5.1	8			A8 A136	II III	E2 E1	558 Y544 559 Y545	5 kg 2.5 kg 25 kg 5 kg	562 563	25 kg 100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
+	**Calcium hypochlorite, hydrated mixture, corrosive** with not less than 5.5% but not more than 16% water	3487	5.1	8			A8 A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
								III	E1	559 Y545	25 kg 5 kg	563	100 kg
+	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an inhalation toxicity lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3488	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an inhalation toxicity lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3489	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3490	6.1	3 4.3						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3491	6.1	3 4.3						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, corrosive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3492	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, corrosive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3493	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Petroleum sour crude oil, flammable, toxic**	3494	3	6.1			A166	I	E0	FORBIDDEN		360	2.5 L
								II	E2	352 Y341	1 L 1 L	363	5 L
								III	E1	355 Y343	60 L 2 L	365	60 L
+	**Iodine**	3495	8	6.1			A113	III	E1	860 Y845	25 kg 5 kg	864	100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
									☑				
*	**Consumer commodity** †	8000	9				A112		E2	910	30 kg G	910	30 kg G
≠	**Consumer commodity** †	8000	9				A112		E0	910	30 kg G	910	30 kg G

ATTACHMENT B

PROPOSED AMENDMENTS TO TABLE 3-1 — ALPHABETICAL ORDER

The format for displaying the amendments to Table 3-1 is as follows:

Modified entries

- both the original and the modified entry are printed;
- both modified and non-modified fields are printed;
- the original entry is printed in a shaded box with an asterisk in the left margin;
- check boxes are printed above the field(s) which have been modified;
- the modified entry is shown without shading below the original entry; and
- the "≠" symbol is printed in the left margin.

Deleted entries

- deleted entries are displayed in a shaded box with an asterisk in the left margin;
- check boxes are shown above each field; and
- the ">" symbol is displayed in the left margin below the shaded box to indicate that the entry will be deleted.

New entries

New entries are shown without shading with the "+" symbol in the left margin.

Editorial Note.— Column 5 (Labels) is left blank in the proposed amendments to Table 3-1. The values, which are based on those in Columns 3 (Class or Division) and 4 (Subsidiary Risk), will appear in the published edition.

Table 3-1. Dangerous Goods List

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Aerosols**, flammable	1950	2.1		Gas flammable		A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable	1950	2.1				A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.1	6.1 8			A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.1	6.1 8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.1	8			A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.1	8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, flammable (engine starting fluid)	1950	2.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145 A153		E0	FORBIDDEN		203	150 kg
≠	**Aerosols**, flammable (engine starting fluid)	1950	2.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		203	150 kg
*	**Aerosols**, flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.1	6.1			A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.1	6.1			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Aerosols**, non-flammable	1950	2.2				☑ A98 A145 A153		E0	203 or 204 Y203 or Y204	75 kg 30 kg G	203 or 204	150 kg
≠	**Aerosols**, non-flammable	1950	2.2				A98 A145 A167		E0	203 or 204 Y203 or Y204	75 kg 30 kg G	203 or 204	150 kg
*	**Aerosols**, non-flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.2	6.1 8			☑ A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, non-flammable, containing substances in Division 6.1, Packing Group III and substances in Class 8, Packing Group III	1950	2.2	6.1 8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, non-flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.2	8			☑ A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, non-flammable, corrosive, containing substances in Class 8, Packing Group III	1950	2.2	8			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A145 A153		E0	FORBIDDEN		212	50 kg
≠	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145 A167		E0	FORBIDDEN		212	50 kg
*	**Aerosols**, non-flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.2	6.1			☑ A145 A153		E0	203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, non-flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.2	6.1			A145 A167		E0	203 Y203	75 kg 30 kg G	203	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Aerosols**, oxidizing	1950	2.2	5.1			☑ A145 A153		E0	203	75 kg	203	150 kg
≠	**Aerosols**, oxidizing	1950	2.2	5.1			A145 A167		E0	203	75 kg	203	150 kg
*	**Air, compressed**	1002	2.2				☑ A124		E1	200	75 kg	200	150 kg
≠	**Air, compressed**	1002	2.2						E1	200	75 kg	200	150 kg
*	**Alcohols, n.o.s.***	1987	3				☑ A3	II III	E2 E1	☑ 305 Y305 309 Y309	 5 L 1 L 60 L 10 L	☑ 307 310	 60 L 220 L
≠	**Alcohols, n.o.s.***	1987	3				A3 A180	II III	E2 E1	353 Y341 355 Y344	5 L 1 L 60 L 10 L	364 366	60 L 220 L
*	**Alkali metal dispersion**	1391	4.3				☑ A84 A147	I	E0	FORBIDDEN		☑ 409	 1 L
≠	**Alkali metal dispersion**	1391	4.3				A84	I	E0	FORBIDDEN		480	1 L
+	**Alkali metal dispersion,**	3482	4.3	3			A84	I	E0	FORBIDDEN		480	1 L
*	**Alkaline earth metal dispersion**	1391	4.3				☑ A85 A147	I	E0	FORBIDDEN		☑ 409	 1 L
≠	**Alkaline earth metal dispersion**	1391	4.3				A85	I	E0	FORBIDDEN		480	1 L
+	**Alkaline earth metal dispersion, flammable**	3482	4.3	3			A85	I	E0	FORBIDDEN		480	1 L
*	**Allyltrichlorosilane, stabilized**	1724	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		☑ 813	 30 L
≠	**Allyltrichlorosilane, stabilized**	1724	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
												☑	
*	**Amyltrichlorosilane**	1728	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Amyltrichlorosilane**	1728	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	☑									☑		☑	
*	**Antimony compound, inorganic, liquid, n.o.s.**	3141	6.1				A12	III	E1	611 Y611	60 L 2 L	618	220 L
≠	**Antimony compound, inorganic, liquid, n.o.s.***	3141	6.1				A12	III	E1	655 Y642	60 L 2 L	663	220 L
	☑									☑		☑	
*	**Antimony compound, inorganic, solid, n.o.s.**	1549	6.1				A12	III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Antimony compound, inorganic, solid, n.o.s.***	1549	6.1				A12	III	E1	670 Y645	100 kg 10 kg	677	200 kg
	☑									☑		☑	
*	**Arsenic compound, liquid, n.o.s.**, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1556	6.1				A3 A4 A6	I II	E5 E4	603 609 Y609	1 L 5 L 1 L	604 611	30 L 60 L
								III	E1	611 Y611	60 L 2 L	618	220 L
≠	**Arsenic compound, liquid, n.o.s.***, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1556	6.1				A3 A4 A6	I II	E5 E4	652 654 Y641	1 L 5 L 1 L	658 662	30 L 60 L
								III	E1	655 Y642	60 L 2 L	663	220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Arsenic compound, solid, n.o.s.**, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1557	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Arsenic compound, solid, n.o.s.***, inorganic, including: Arsenates, n.o.s.; Arsenites, n.o.s.; and Arsenic sulphides	1557	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Articles, explosive, n.o.s.***	0350	1.4B				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0350	1.4B				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0354	1.1L				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0354	1.1L				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0355	1.2L				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0355	1.2L				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0356	1.3L				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0356	1.3L				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0462	1.1C				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0462	1.1C				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0463	1.1D				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0463	1.1D				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0464	1.1E				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0464	1.1E				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0465	1.1F				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0465	1.1F				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0466	1.2C				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0466	1.2C				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0467	1.2D				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0467	1.2D				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0468	1.2E				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0468	1.2E				A62			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Articles, explosive, n.o.s.***	0469	1.2F				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0469	1.2F				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, n.o.s.***	0470	1.3C				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, n.o.s.***	0470	1.3C				A62			FORBIDDEN		FORBIDDEN	
*	**Articles, explosive, extremely insensitive** †	0486	1.6N				☑			FORBIDDEN		FORBIDDEN	
≠	**Articles, explosive, extremely insensitive** †	0486	1.6N				A62			FORBIDDEN		FORBIDDEN	
*	**Aviation regulated liquid, n.o.s.***	3334	9				A27 A48		☑ E0	☑ 906	No limit	☑ 906	No limit
≠	**Aviation regulated liquid, n.o.s.***	3334	9				A27 A48		E1	964	No limit	964	No limit
*	**Aviation regulated solid, n.o.s.***	3335	9				A27 A48		☑ E0	☑ 906	No limit	☑ 906	No limit
≠	**Aviation regulated solid, n.o.s.***	3335	9				A27 A48		E1	956	No limit	956	No limit
*	**Barium compound, n.o.s.**	1564	6.1				A3 A82	II III	E4 E1	☑ 613 Y613 619 Y619	 25 kg 1 kg 100 kg 10 kg	☑ 615 619	 100 kg 200 kg
≠	**Barium compound, n.o.s.***	1564	6.1				A3 A82	II III	E4 E1	669 Y644 670 Y645	25 kg 1 kg 100 kg 10 kg	676 677	100 kg 200 kg
*	**Batteries, containing sodium** †	3292	4.3				☑ A94	II	E0	FORBIDDEN		☑ 433	No limit
≠	**Batteries, containing sodium** †	3292	4.3				A94 A183	II	E0	FORBIDDEN		492	No limit
*	**Batteries, dry, containing potassium hydroxide solid**, electric storage †	3028	8				☑		E0	802	25 kg G	802	230 kg G
≠	**Batteries, dry, containing potassium hydroxide solid**, electric storage †	3028	8				A183		E0	802	25 kg G	802	230 kg G

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Batteries, wet, filled with acid**, electric storage †	2794	8				☑ A51 A164		E0	800	30 kg G	800	No limit
≠	**Batteries, wet, filled with acid**, electric storage †	2794	8				A51 A164 A183		E0	800	30 kg G	800	No limit
*	**Batteries, wet, filled with alkali**, electric storage †	2795	8				☑ A51 A164		E0	800	30 kg G	800	No limit
≠	**Batteries, wet, filled with alkali**, electric storage †	2795	8				A51 A164 A183		E0	800	30 kg G	800	No limit
*	**Batteries, wet, non-spillable**, electric storage	2800	8				☑ A48 A67 A164		E0	806	No limit	806	No limit
≠	**Batteries, wet, non-spillable**, electric storage	2800	8				A48 A67 A164 A183		E0	806	No limit	806	No limit
*	**Battery-powered equipment**	3171	9				☑ A21 A67 A87 A94 A164		E0	☑ 900	No limit	☑ 900	No limit
≠	**Battery-powered equipment**	3171	9				A21 A67 A87 A94 A164 A182		E0	952	No limit	952	No limit
*	☑ **Beryllium compound, n.o.s.**	1566	6.1			US 4	A3	II III	E4 E1	☑ 613 Y613 619 Y619	 25 kg 1 kg 100 kg 10 kg	☑ 615 619	 100 kg 200 kg
≠	**Beryllium compound, n.o.s.***	1566	6.1			US 4	A3	II III	E4 E1	669 Y644 670 Y645	25 kg 1 kg 100 kg 10 kg	676 677	100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑						☑			☑		☑	
*	**Bromates, inorganic, n.o.s.**	1450	5.1					II	E2	508 Y508	5 kg 2.5 kg	511	25 kg
≠	**Bromates, inorganic, n.o.s.***	1450	5.1				A170	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	☑						☑			☑		☑	
*	**Bromates, inorganic, aqueous solution, n.o.s.**	3213	5.1				A3	II III	E2 E1	503 Y503 514 Y514	1 L 0.5 L 2.5 L 1 L	505 515	5 L 30 L
≠	**Bromates, inorganic, aqueous solution, n.o.s.***	3213	5.1				A3 A170	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
												☑	
*	**Butyltrichlorosilane**	1747	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Butyltrichlorosilane**	1747	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
	☑									☑		☑	
*	**Cadmium compound**	2570	6.1			US 4	A3 A5	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Cadmium compound***	2570	6.1			US 4	A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Calcium hypochlorite, dry**	1748	5.1			US 4	A135 A136	II III	E2 E1	509 Y509 517 Y517	5 kg 2.5 kg 25 kg 10 kg	512 519	25 kg 100 kg
≠	**Calcium hypochlorite, dry**	1748	5.1			US 4	A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
+	**Calcium hypochlorite, dry, corrosive** with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	8			A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
*	**Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A135 A136	II III	E2 E1	508 Y508 516 Y516	5 kg 2.5 kg 25 kg 10 kg	511 518	25 kg 100 kg
≠	**Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
+	**Calcium hypochlorite, hydrated, corrosive** with not less than 5.5% but not more than 16% water	3487	5.1	8			A8 A136	II III	E2 E1	558 Y544 559 Y545	5 kg 2.5 kg 25 kg 5 kg	562 563	25 kg 100 kg
*	**Calcium hypochlorite, hydrated mixture** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A135 A136	II III	E2 E1	508 Y508 516 Y516	5 kg 2.5 kg 25 kg 10 kg	511 518	25 kg 100 kg
≠	**Calcium hypochlorite, hydrated mixture** with not less than 5.5% but not more than 16% water	2880	5.1			US 4	A3 A8 A136	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
+	**Calcium hypochlorite, hydrated mixture, corrosive** with not less than 5.5% but not more than 16% water	3487	5.1	8			A8 A136	II III	E2 E1	558 Y544 559 Y545	5 kg 2.5 kg 25 kg 5 kg	562 563	25 kg 100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑			☑		☑	
*	**Calcium hypochlorite mixture, dry** with more than 10% but not more than 39% available chlorine	2208	5.1			US 4	A135 A136	III	E1	517 Y517	25 kg 10 kg	519	100 kg
≠	**Calcium hypochlorite mixture, dry** with more than 10% but not more than 39% available chlorine	2208	5.1			US 4	A136	III	E1	559 Y546	25 kg 10 kg	563	100 kg
+	**Calcium hypochlorite mixture, dry, corrosive** with more than 39% available chlorine (8.8% available oxygen)	3485	5.1	8			A136	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
+	**Calcium hypochlorite mixture, dry, corrosive** with more than 10% but not more than 39% available chlorine	3486	5.1	8			A136	III	E1	559 Y545	25 kg 5 kg	563	100 kg
								☑		☑		☑	
*	**Carbon dioxide, solid**	1845	9				A48 A151	III	E0	904	200 kg	904	200 kg
≠	**Carbon dioxide, solid**	1845	9				A48 A151		E0	954	200 kg	954	200 kg
							☑						
*	**Charges, shaped** without detonator †	0059	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3	A109			FORBIDDEN		FORBIDDEN	
≠	**Charges, shaped** without detonator †	0059	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3				FORBIDDEN		FORBIDDEN	
	☑						☑			☑		☑	
*	**Chlorates, inorganic, n.o.s.**	1461	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Chlorates, inorganic, n.o.s.***	1461	5.1				A171	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑						☑			☑		☑	
*	**Chlorates, inorganic, aqueous solution, n.o.s.**	3210	5.1				A3	II III	E2 E1	501 Y501 506 Y506	1 L 0.5 L 2.5 L 1 L	506 507	5 L 30 L
≠	**Chlorates, inorganic, aqueous solution, n.o.s.***	3210	5.1				A3 A171	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
	☑						☑			☑		☑	
*	**Chlorites, inorganic, n.o.s.**	1462	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Chlorites, inorganic, n.o.s.***	1462	5.1				A172	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	☑									☑		☑	
*	**Chloroformates, toxic, corrosive, flammable, n.o.s.**	2742	6.1	3 8				II	E4	609 Y609	1 L 0.5 L	611	30 L
≠	**Chloroformates, toxic, corrosive, flammable, n.o.s.***	2742	6.1	3 8				II	E4	653 Y640	1 L 0.5 L	660	30 L
												☑	
*	**Chlorophenyltrichlorosilane**	1753	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Chlorophenyltrichlorosilane**	1753	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	☑ **Chloropicrin mixture, n.o.s.**	1583	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2 A3 A137	I		FORBIDDEN		FORBIDDEN	
≠	**Chloropicrin mixture, n.o.s.***	1583	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2 A3 A137	I		FORBIDDEN		FORBIDDEN	
*	**Chlorosilanes, corrosive, n.o.s.**	2987	8				☑	II	☑ E2	☑ 808	☑ 1 L	☑ 812	30 L
≠	**Chlorosilanes, corrosive, n.o.s.**	2987	8				A1	II	E0	FORBIDDEN		876	30 L
*	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3			☑	II	☑ E2	☑ 808	☑ 1 L	☑ 812	30 L
≠	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3			A1	II	E0	FORBIDDEN		876	30 L
*	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8				II	E2	☑ 305	1 L	☑ 307	5 L
≠	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8				II	E2	352	1 L	377	5 L
*	☑ **Chlorosilanes, toxic, corrosive, n.o.s.**	3361	6.1	8				II	E4	☑ 609	1 L	☑ 611	30 L
≠	**Chlorosilanes, toxic, corrosive, n.o.s. ***	3361	6.1	8				II	E4	681	1 L	681	30 L
*	☑ **Chlorosilanes, toxic, corrosive, flammable, n.o.s.**	3362	6.1	3 8				II	E4	☑ 609	1 L	☑ 611	30 L
≠	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.***	3362	6.1	3 8				II	E4	681	1 L	681	30 L
*	**Compressed gas, n.o.s.***	1956	2.2				☑ A124		E1	200	75 kg	200	150 kg
≠	**Compressed gas, n.o.s.***	1956	2.2						E1	200	75 kg	200	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
									☑				
*	**Consumer commodity** †	8000	9				A112		E2	910	30 kg G	910	30 kg G
≠	**Consumer commodity** †	8000	9				A112		E0	910	30 kg G	910	30 kg G
							☑						
*	**Cord, detonating**, flexible †	0065	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3	A109			FORBIDDEN		FORBIDDEN	
≠	**Cord, detonating**, flexible †	0065	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3				FORBIDDEN		FORBIDDEN	
	☑									☑		☑	
*	**Cyanide solution, n.o.s.**	1935	6.1				A3	I II III	E5 E4 E1	610 617 Y617 612 Y612	1 L 5 L 1 L 60 L 2 L	605 612 620	30 L 60 L 220 L
≠	**Cyanide solution, n.o.s.***	1935	6.1				A3	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 661 663	30 L 60 L 220 L
												☑	
*	**Cyclohexenyltrichlorosilane**	1762	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Cyclohexenyltrichlorosilane**	1762	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Cyclohexyltrichlorosilane**	1763	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Cyclohexyltrichlorosilane**	1763	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Dibenzyldichlorosilane**	2434	8					II	E2	808 Y808	1 L 0.5 L	812	30 L
≠	**Dibenzyldichlorosilane**	2434	8				A1	II	E2	FORBIDDEN		876	30 L
*	**Dichlorophenyltrichlorosilane**	1766	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Dichlorophenyltrichlorosilane**	1766	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Diethyldichlorosilane**	1767	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Diethyldichlorosilane**	1767	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
										☑		☑	
*	**Dimethyldichlorosilane**	1162	3	8				II	E2	305	1 L	307	5 L
≠	**Dimethyldichlorosilane**	1162	3	8				II	E2	352	1 L	377	5 L
												☑	
*	**Diphenyldichlorosilane**	1769	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Diphenyldichlorosilane**	1769	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
												☑	
*	**Dodecyltrichlorosilane**	1771	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Dodecyltrichlorosilane**	1771	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
								☑		☑		☑	
*	**Dry ice**	1845	9				A48 A151	III	E0	904	200 kg	904	200 kg
≠	**Dry ice**	1845	9				A48 A151		E0	954	200 kg	954	200 kg
	☑												
*	**Elevated temperature liquid, n.o.s.**, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	3257	9					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature liquid, n.o.s.***, at or above 100°C and below its flash point (including molten metals, molten salts, etc.)	3257	9					III		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑												
*	**Elevated temperature liquid, flammable, n.o.s.**, with flash point above 60°C, at or above its flash point	3256	3					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature liquid, flammable, n.o.s.***, with flash point above 60°C, at or above its flash point	3256	3					III		FORBIDDEN		FORBIDDEN	
	☑												
*	**Elevated temperature solid, n.o.s.**, at or above 240°C	3258	9					III		FORBIDDEN		FORBIDDEN	
≠	**Elevated temperature solid, n.o.s.***, at or above 240°C	3258	9					III		FORBIDDEN		FORBIDDEN	
+	**Engine, fuel cell, flammable gas powered** †	3166	9				A67 A70 A87 A134 A176		E0	FORBIDDEN		951	No limit
+	**Engine, fuel cell, flammable liquid powered** †	3166	9				A67 A70 A87 A134 A176		E0	950	No limit	950	No limit
	☑											☑	
*	**Engines, internal combustion, flammable gas powered**	3166	9				A67 A70 A87 A134		E0	FORBIDDEN		900	No limit
≠	**Engine, internal combustion, flammable gas powered**	3166	9				A67 A70 A87 A134		E0	FORBIDDEN		951	No limit
	☑									☑		☑	
*	**Engines, internal combustion, flammable liquid powered**	3166	9				A67 A70 A87 A134		E0	900	No limit	900	No limit
≠	**Engine, internal combustion, flammable liquid powered**	3166	9				A67 A70 A87 A134		E0	950	No limit	950	No limit

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Ethanol**	1170	3				A3 A58	II III	E2 E1	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethanol**	1170	3				A3 A58 A180	II III	E2 E1	353 Y341 355 Y344	5 L 1 L 60 L 10 L	364 366	60 L 220 L
*	**Ethyl isocyanate**	2481	3	6.1	☑	US 2		I	E0	FORBIDDEN		304	30 L
≠	**Ethyl isocyanate**	2481	6.1	3		US 2		I		FORBIDDEN		FORBIDDEN	
*	**Ethylphenyldichlorosilane**	2435	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Ethylphenyldichlorosilane**	2435	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Ethyltrichlorosilane**	1196	3	8				II	E2	306	1 L	304	5 L
≠	**Ethyltrichlorosilane**	1196	3	8				II	E2	352	1 L	377	5 L
*	**Fluorosilicates, n.o.s.**	2856	6.1					III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Fluorosilicates, n.o.s.***	2856	6.1					III	E1	670 Y645	100 kg 10 kg	677	200 kg
*	**Formaldehyde solution, flammable**	1198	3	8				III	E1	309 Y309	5 L 1 L	310	60 L
≠	**Formaldehyde solution, flammable**	1198	3	8			A180	III	E1	354 Y342	5 L 1 L	365	60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑						☑						
*	**Fracturing devices, explosive**, without detonator for oil wells†	0099	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3	A109			FORBIDDEN		FORBIDDEN	
≠	**Fracturing devices, explosive**, without detonator for oil wells †	0099	1.1D			AU 2 CA 7 GB 3 IR 3 NL 1 US 3				FORBIDDEN		FORBIDDEN	
	☑							☑	☑	☑	☑	☑	☑
*	**Fuel cell cartridges**, containing corrosive substances	3477	8				A146 A157		E0	873	5 kg	873	50 kg
≠	**Fuel cell cartridges**, containing corrosive substances †	3477	8				A146 A157		E0	873 Y873	5 kg 2.5 kg	873	50 kg
	☑							☑	☑	☑	☑	☑	☑
*	**Fuel cell cartridges**, containing flammable liquids	3473	3				A146		E0	374	5 kg	374	50 kg
≠	**Fuel cell cartridges**, containing flammable liquids †	3473	3				A146		E0	374 Y374	5 kg 2.5 kg	374	50 kg
	☑							☑	☑	☑	☑	☑	☑
*	**Fuel cell cartridges**, containing hydrogen in metal hydride	3479	2.1				A146 A162		E0	215	1 kg	215	15 kg
≠	**Fuel cell cartridges**, containing hydrogen in metal hydride †	3479	2.1				A146 A162		E0	215 Y215	1 kg 0.5 kg	215	15 kg
	☑							☑	☑	☑	☑	☑	☑
*	**Fuel cell cartridges**, containing liquefied flammable gas	3478	2.1				A146 A161		E0	215	1 kg	215	15 kg
≠	**Fuel cell cartridges**, containing liquefied flammable gas †	3478	2.1				A146 A161		E0	215 Y215	1 kg 0.5 kg	215	15 kg
	☑							☑	☑	☑	☑	☑	☑
*	**Fuel cell cartridges**, containing water-reactive substances	3476	4.3				A146 A157		E0	495	5 kg	495	50 kg
≠	**Fuel cell cartridges**, containing water-reactive substances †	3476	4.3				A146 A157		E0	495 Y495	5 kg 2.5 kg	495	50 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1				☑		E0	203 Y203	1 kg 1 kg	203	15 kg
≠	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1				A167		E0	203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2				☑ A98		E0	203 Y203	1 kg 1 kg	203	15 kg
≠	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2				A98 A167		E0	203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1			☑		E0	203	1 kg	203	15 kg
≠	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1			A167		E0	203	1 kg	203	15 kg
*	**Hexadecyltrichlorosilane**	1781	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		☑ 813	30 L
≠	**Hexadecyltrichlorosilane**	1781	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Hexyltrichlorosilane**	1784	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		☑ 813	30 L
≠	**Hexyltrichlorosilane**	1784	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑			☑		☑	
*	**Hydrazine, aqueous solution** with more than 37% hydrazine by mass	2030	8	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A36 A147	I II III	E0 E0 E1	FORBIDDEN FORBIDDEN 818 Y818	 5 L 1 L	809 812 820	2.5 L 30 L 60 L
≠	**Hydrazine, aqueous solution** with more than 37% hydrazine by mass	2030	8	6.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A36	I II III	E0 E0 E1	FORBIDDEN FORBIDDEN 852 Y841	 5 L 1 L	854 855 856	2.5 L 30 L 60 L
+	**Hydrazine aqueous solution, flammable** with more than 37% hydrazine, by mass	3484	8	3 6.1			A1	I	E0	FORBIDDEN		854	2.5 L
							☑						
*	**Hydrogen in a metal hydride storage system**	3468	2.1				A1 A143		E0	FORBIDDEN		214	100 kg G
≠	**Hydrogen in a metal hydride storage system**	3468	2.1				A1 A143 A176		E0	FORBIDDEN		214	100 kg G
							☑						
*	**Hydrogen in a metal hydride storage system contained in equipment**	3468	2.1				A1 A143		E0	FORBIDDEN		214	100 kg G
≠	**Hydrogen in a metal hydride storage system contained in equipment**	3468	2.1				A1 A143 A176		E0	FORBIDDEN		214	100 kg G
							☑						
*	**Hydrogen in a metal hydride storage system packed with equipment**	3468	2.1				A1 A143		E0	FORBIDDEN		214	100 kg G
≠	**Hydrogen in a metal hydride storage system packed with equipment**	3468	2.1				A1 A143 A176		E0	FORBIDDEN		214	100 kg G
	☑						☑			☑		☑	
*	**1-Hydroxybenzotriazole, anhydrous, wetted** with not less than 20% water, by mass	3474	4.1				A40	I	E0	416	0.5 kg	416	0.5 kg
≠	**1-Hydroxybenzotriazole monohydrate**	3474	4.1					I	E0	451	0.5 kg	451	0.5 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Hypochlorites, inorganic, n.o.s.**	3212	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Hypochlorites, inorganic, n.o.s.***	3212	5.1				A169	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
*	**Infectious substance, affecting animals** only	2900	6.2			AU 3 CA 5 CA 10 GB 5 VU 2	A81 A140		E0	602	50 mL or 50 g	602	4 L or 4 kg
≠	**Infectious substance, affecting animals** only	2900	6.2			AU 3 CA 5 CA 10 GB 5 VU 2	A81 A140		E0	620	50 mL or 50 g	620	4 L or 4 kg
*	**Infectious substance, affecting humans**	2814	6.2			AU 3 CA 5 CA 11 GB 5 VU 2	A81 A140		E0	602	50 mL or 50 g	602	4 L or 4 kg
≠	**Infectious substance, affecting humans**	2814	6.2			AU 3 CA 5 CA 11 GB 5 VU 2	A81 A140		E0	620	50 mL or 50 g	620	4 L or 4 kg
+	**Iodine**	3495	8	6.1			A113	III	E1	860 Y845	25 kg 5 kg	864	100 kg
*	**Isobutyl isocyanate**	2486	3	6.1		US 2		II	E2	306 Y306	1 L 1 L	308	60 L
≠	**Isobutyl isocyanate**	2486	6.1	3		US 2				FORBIDDEN		FORBIDDEN	
*	**Isopropanol**	1219	3					II	E2	305 Y305	5 L 1 L	307	60 L
≠	**Isopropanol**	1219	3				A180	II	E2	353 Y341	5 L 1 L	364	60 L
*	**Isopropyl isocyanate**	2483	3	6.1						FORBIDDEN		FORBIDDEN	
≠	**Isopropyl isocyanate**	2483	6.1	3						FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Lead compound, soluble, n.o.s.**	2291	6.1				A92	III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Lead compound, soluble, n.o.s.***	2291	6.1				A92	III	E1	670 Y645	100 kg 10 kg	677	200 kg
							☑	☑	☑	☑	☑	☑	☑
*	**Lithium hypochlorite, dry**	1471	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Lithium hypochlorite, dry**	1471	5.1				A3	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
							☑	☑	☑	☑	☑	☑	☑
*	**Lithium hypochlorite mixture**	1471	5.1					II	E2	509 Y509	5 kg 2.5 kg	512	25 kg
≠	**Lithium hypochlorite mixture**	1471	5.1				A3	II III	E2 E1	558 Y544 559 Y546	5 kg 2.5 kg 25 kg 10 kg	562 563	25 kg 100 kg
							☑						
*	**Lithium ion batteries** (including lithium ion polymer batteries)	3480	9				A88 A99 A154 A164	II	E0	965	5 kg G	965	35 kg G
≠	**Lithium ion batteries** (including lithium ion polymer batteries)	3480	9				A88 A99 A154 A164 A183	II	E0	965	5 kg G	965	35 kg G
							☑						
*	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)	3481	9				A48 A154 A164	II	E0	see 967		see 967	
≠	**Lithium ion batteries contained in equipment** (including lithium ion polymer batteries)	3481	9				A48 A99 A154 A164 A181	II	E0	see 967		see 967	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)	3481	9				☑ A88 A154 A164	II	E0	see 966		see 966	
≠	**Lithium ion batteries packed with equipment** (including lithium ion polymer batteries)	3481	9				A88 A154 A164 A181	II	E0	see 966		see 966	
*	**Lithium metal batteries** (including lithium alloy batteries)†	3090	9			US 2 US 3	☑ A88 A99 A154 A164	II	E0	968	2.5 kg G	968	35 kg G
≠	**Lithium metal batteries** (including lithium alloy batteries)†	3090	9			US 2 US 3	A88 A99 A154 A164 A183	II	E0	968	2.5 kg G	968	35 kg G
*	**Lithium metal batteries contained in equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	☑ A48 A154 A164	II	E0	see 970		see 970	
≠	**Lithium metal batteries contained in equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	A48 A99 A154 A164 A181	II	E0	see 970		see 970	
*	**Lithium metal batteries packed with equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	☑ A154 A164	II	E0	see 969		see 969	
≠	**Lithium metal batteries packed with equipment** (including lithium alloy batteries)†	3091	9			US 2 US 3	A154 A164 A181	II	E0	see 969		see 969	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Mercury compound, liquid, n.o.s.**	2024	6.1				A3 A4 A6 A18	I II III	E5 E4 E1	610 617 Y617 612 Y612	1 L 5 L 1 L 60 L 2 L	605 612 620	30 L 60 L 220 L
≠	**Mercury compound, liquid, n.o.s.***	2024	6.1				A3 A4 A6 A18	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 661 663	30 L 60 L 220 L
	☑									☑		☑	
*	**Mercury compound, solid, n.o.s.**	2025	6.1				A3 A5 A6 A18	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Mercury compound, solid, n.o.s.***	2025	6.1				A3 A5 A6 A18	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
	☑									☑		☑	
*	**Metal catalyst, dry**	2881	4.2				A3 A36	I II III	 E0 E1	FORBIDDEN FORBIDDEN 422	 25 kg	FORBIDDEN 416 421	 50 kg 100 kg
≠	**Metal catalyst, dry***	2881	4.2				A3 A36	I II III	 E0 E1	FORBIDDEN FORBIDDEN 473	 25 kg	FORBIDDEN 473 473	 50 kg 100 kg
	☑											☑	
*	**Metal catalyst, wetted** with a visible excess of liquid	1378	4.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		416	50 kg
≠	**Metal catalyst, wetted*** with a visible excess of liquid	1378	4.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		473	50 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Methacrylonitrile, stabilized**	3079	3	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Methacrylonitrile, stabilized**	3079	6.1	3				I		FORBIDDEN		FORBIDDEN	
*	**Methoxymethyl isocyanate**	2605	3	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Methoxymethyl isocyanate**	2605	6.1	3				I		FORBIDDEN		FORBIDDEN	
*	**Methylphenyldichlorosilane**	2437	8				☑	II	E2	☑ 808	☑ 1 L	☑ 812	30 L
≠	**Methylphenyldichlorosilane**	2437	8				A1	II	E2	FORBIDDEN		876	30 L
*	**Methyltrichlorosilane**	1250	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	☑ 306	1 L	☑ 304	5 L
≠	**Methyltrichlorosilane**	1250	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	352	1 L	377	5 L
*	**Motor fuel anti-knock mixture**	1649	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A147	I	E0	FORBIDDEN		☑ 605	30 L
≠	**Motor fuel anti-knock mixture**	1649	6.1			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	I	E0	FORBIDDEN		658	30 L
+	**Motor fuel anti-knock mixture, flammable**	3483	6.1	3			A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Nicotine compound, liquid, n.o.s.**	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Nicotine compound, liquid, n.o.s.***	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
	☑									☑		☑	
*	**Nicotine compound, solid, n.o.s.**	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Nicotine compound, solid, n.o.s.***	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
	☑									☑		☑	
*	**Nicotine preparation, liquid, n.o.s.**	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Nicotine preparation, liquid, n.o.s.***	3144	6.1			US 4	A3 A4 A6	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
	☑									☑		☑	
*	**Nicotine preparation, solid, n.o.s.**	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Nicotine preparation, solid, n.o.s.***	1655	6.1			US 4	A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Nitrites, inorganic, n.o.s.**	2627	5.1				A33	II	E2	508 Y508	5 kg 2.5 kg	511	25 kg
≠	**Nitrites, inorganic, n.o.s.***	2627	5.1				A33	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
	☑									☑		☑	
*	**Nitrites, inorganic, aqueous solution, n.o.s.**	3219	5.1				A3 A33	II III	E2 E1	503 Y503 514 Y514	1 L 0.5 L 2.5 L 1 L	505 515	5 L 30 L
≠	**Nitrites, inorganic, aqueous solution, n.o.s.***	3219	5.1				A3 A33	II III	E2 E1	550 Y540 551 Y541	1 L 0.5 L 2.5 L 1 L	554 555	5 L 30 L
							☑						
*	**Nitrogen, refrigerated liquid**	1977	2.2				A152		E1	202	50 kg	202	500 kg
≠	**Nitrogen, refrigerated liquid**	1977	2.2				A152 A168		E1	202	50 kg	202	500 kg
												☑	
*	**Nonyltrichlorosilane**	1799	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Nonyltrichlorosilane**	1799	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
												☑	
*	**Octadecyltrichlorosilane**	1800	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Octadecyltrichlorosilane**	1800	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Octyltrichlorosilane**	1801	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Octyltrichlorosilane**	1801	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Organic peroxide type C, liquid***	3103	5.2				A14 A20 A150		E0	500	5 L	502	10 L
≠	**Organic peroxide type C, liquid***	3103	5.2				A20 A150		E0	500	5 L	502	10 L
*	**Organic peroxide type C, solid***	3104	5.2				A14 A20 A150		E0	510	5 kg	513	10 kg
≠	**Organic peroxide type C, solid***	3104	5.2				A20 A150		E0	510	5 kg	513	10 kg
*	**Organic peroxide type D, liquid***	3105	5.2				A14 A20 A150		E0	500	5 L	502	10 L
≠	**Organic peroxide type D, liquid***	3105	5.2				A20 A150		E0	500	5 L	502	10 L
*	**Organic peroxide type D, solid***	3106	5.2				A14 A20		E0	510	5 kg	513	10 kg
≠	**Organic peroxide type D, solid***	3106	5.2				A20		E0	510	5 kg	513	10 kg
*	**Organic peroxide type E, liquid***	3107	5.2				A14 A20 A150		E0	500	10 L	502	25 L
≠	**Organic peroxide type E, liquid***	3107	5.2				A20 A150		E0	500	10 L	502	25 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Organic peroxide type E, solid***	3108	5.2				☑ A14 A20		E0	510	10 kg	513	25 kg
≠	**Organic peroxide type E, solid***	3108	5.2				A20		E0	510	10 kg	513	25 kg
*	**Organic peroxide type F, liquid***	3109	5.2				☑ A14 A20 A150		E0	500	10 L	502	25 L
≠	**Organic peroxide type F, liquid***	3109	5.2				A20 A150		E0	500	10 L	502	25 L
*	**Organic peroxide type F, solid***	3110	5.2				☑ A14 A20		E0	510	10 kg	513	25 kg
≠	**Organic peroxide type F, solid***	3110	5.2				A20		E0	510	10 kg	513	25 kg
*	**Oxygen, compressed**	1072	2.2	5.1		US 18	☑		E0	200	75 kg	200	150 kg
≠	**Oxygen, compressed**	1072	2.2	5.1		US 18	A175		E0	200	75 kg	200	150 kg
*	**Oxygen generator, chemical** † (including when contained in associated equipment, e.g. passenger service units (PSUs), protective breathing equipment (PBE), etc.)	3356	5.1			AU 1 CA 7 FR 7 GB 3 IR 3 NL 1 US 3 US 18	A1 A111 A116 A144	II	E0	FORBIDDEN		☑ 523	☑ 25 kg G
≠	**Oxygen generator, chemical** † (including when contained in associated equipment, e.g. passenger service units (PSUs), protective breathing equipment (PBE), etc.)	3356	5.1			AU 1 CA 7 FR 7 GB 3 IR 3 NL 1 US 3 US 18	A1 A111 A116 A144	II	E0	FORBIDDEN		565	25 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
							☑			☑		☑	
*	**Perfumery products** with flammable solvents	1266	3				A3	II	E2	305 Y305	5 L 1 L	307	60 L
								III	E1	309 Y309	60 L 10 L	310	220 L
≠	**Perfumery products** with flammable solvents	1266	3				A3 A72	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	☑						☑			☑		☑	
*	**Permanganates, inorganic, n.o.s.**	1482	5.1				A3 A37	II	E2	508 Y508	5 kg 2.5 kg	511	25 kg
								III	E1	516 Y516	25 kg 10 kg	518	100 kg
≠	**Permanganates, inorganic, n.o.s.***	1482	5.1				A3 A37 A173	II	E2	558 Y544	5 kg 2.5 kg	562	25 kg
								III	E1	559 Y546	25 kg 10 kg	563	100 kg
	☑						☑			☑		☑	
*	**Permanganates, inorganic, aqueous solution, n.o.s.**	3214	5.1				A37	II	E2	503 Y503	1 L 0.5 L	505	5 L
≠	**Permanganates, inorganic, aqueous solution, n.o.s.***	3214	5.1				A37 A173	II	E2	550 Y540	1 L 0.5 L	554	5 L
							☑			☑		☑	
*	**Petroleum crude oil**	1267	3				A3	I	E3	302	1 L	303	30 L
								II	E2	305 Y305	5 L 1 L	307	60 L
								III	E1	309 Y309	60 L 10 L	310	220 L
≠	**Petroleum crude oil**	1267	3				A3 A177	I	E3	351	1 L	361	30 L
								II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
+	**Petroleum sour crude oil, flammable, toxic**	3494	3	6.1			A166	I	E0	FORBIDDEN		360	2.5 L
								II	E2	352 Y341	1 L 1 L	363	5 L
								III	E1	355 Y343	60 L 2 L	365	60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Phenylmercuric compound, n.o.s.**	2026	6.1				A3 A5 A6	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Phenylmercuric compound, n.o.s.***	2026	6.1				A3 A5 A6	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
												☑	
*	**Phenyltrichlorosilane**	1804	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Phenyltrichlorosilane**	1804	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
			☑	☑									
*	**Phosphorus oxychloride**	1810	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Phosphorus oxychloride**	1810	6.1	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
+	**Powder, smokeless †**	0509	1.4C							FORBIDDEN		114	75 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Propyltrichlorosilane**	1816	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		813	30 L
≠	**Propyltrichlorosilane**	1816	8	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1	II	E0	FORBIDDEN		876	30 L
*	**Radioactive material, excepted package — limited quantity of material**	2910	7				A130			See Part 2;7			
≠	**Radioactive material, excepted package — limited quantity of material**	2910	7				A23 A130			See Part 1;6			
*	**Radioactive material, transported under special arrangement**, non-fissile or fissile excepted	2919	7			CA 1	A78 A139			See Part 2;7 and Part 4;9			
≠	**Radioactive material, transported under special arrangement**, non-fissile or fissile excepted	2919	7			CA 1	A23 A78 A139			See Part 2;7 and Part 4;9			
*	**Radioactive material, transported under special arrangement, fissile**	3331	7			CA 1	A78			See Part 2;7 and Part 4;9			
≠	**Radioactive material, transported under special arrangement, fissile**	3331	7			CA 1	A76 A78			See Part 2;7 and Part 4;9			
*	**Radioactive material, Type B(M) package**, non-fissile or fissile excepted	2917	7			CA 1	A78 A139 A160			See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type B(M) package**, non-fissile or fissile excepted	2917	7			CA 1	A23 A78 A139 A160			See Part 2;7 and Part 4;9			

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	**Radioactive material, Type B(M) package, fissile**	3329	7			CA 1	A78 A160			See Part 2;7	and Part 4;9		
≠	**Radioactive material, Type B(M) package, fissile**	3329	7			CA 1	A76 A78 A160			See Part 2;7	and Part 4;9		
*	**Radioactive material, Type B(U) package**, non-fissile or fissile excepted	2916	7			CA 1	A78 A139 A160			See Part 2;7	and Part 4;9		
≠	**Radioactive material, Type B(U) package**, non-fissile or fissile excepted	2916	7			CA 1	A23 A78 A139 A160			See Part 2;7	and Part 4;9		
*	**Radioactive material, Type B(U) package, fissile**	3328	7			CA 1	A78 A160			See Part 2;7	and Part 4;9		
≠	**Radioactive material, Type B(U) package, fissile**	3328	7			CA 1	A76 A78 A160			See Part 2;7	and Part 4;9		
*	**Radioactive material, Type C package**, non-fissile or fissile excepted	3323	7			CA 1	A78 A139			See Part 2;7	and Part 4;9		
≠	**Radioactive material, Type C package**, non-fissile or fissile excepted	3323	7			CA 1	A23 A78 A139			See Part 2;7	and Part 4;9		
*	**Radioactive material, Type C package, fissile**	3330	7			CA 1	A78			See Part 2;7	and Part 4;9		
≠	**Radioactive material, Type C package, fissile**	3330	7			CA 1	A76 A78			See Part 2;7	and Part 4;9		
*	Security type equipment such as attaché cases incorporating cash boxes, cash bags, dangerous goods, for example lithium batteries or pyrotechnic material	FORBIDDEN											
≠	Security type equipment	FORBIDDEN					A178						

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Selenates**	2630	6.1			US 4		I	E5	606	5 kg	607	50 kg
≠	**Selenates***	2630	6.1			US 4		I	E5	666	5 kg	673	50 kg
	☑									☑		☑	
*	**Selenites**	2630	6.1			US 4		I	E5	606	5 kg	607	50 kg
≠	**Selenites***	2630	6.1			US 4		I	E5	666	5 kg	673	50 kg
	☑									☑		☑	
*	**Selenium compound, liquid, n.o.s.**	3440	6.1				A3 A4	I II III	E5 E4 E1	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Selenium compound, liquid, n.o.s. ***	3440	6.1				A3 A4	I II III	E5 E4 E1	652 654 Y641 655 Y642	1 L 5 L 1 L 60 L 2 L	658 662 663	30 L 60 L 220 L
	☑									☑		☑	
*	**Selenium compound, solid, n.o.s.**	3283	6.1				A3 A5	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Selenium compound, solid, n.o.s.***	3283	6.1				A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
*	**Silicon tetrachloride**	1818	8				☑	☑ II	☑ E2	☑ 809 Y809	☑ 1 L 0.5 L	☑ 813	☑ 30 L
≠	**Silicon tetrachloride**	1818	8				A1	II	E0	FORBIDDEN		876	30 L
			☑	☑									
*	**Sulphuryl chloride**	1834	8					I		FORBIDDEN		FORBIDDEN	
≠	**Sulphuryl chloride**	1834	6.1	8				I		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Tars, liquid**, including road asphalt and oils, bitumen and cut backs	1999	3				A3	II	E2	305 Y305	5 L 1 L	307	60 L
								III	E1	309 Y309	60 L 10 L	310	220 L
≠	**Tars, liquid**, including road oils, and cutback bitumens	1999	3				A3	II	E2	353 Y341	5 L 1 L	364	60 L
								III	E1	355 Y344	60 L 10 L	366	220 L
	☑									☑		☑	
*	**Tellurium compound, n.o.s.**	3284	6.1				A3 A5	I II	E5 E4	606 613 Y613	5 kg 25 kg 1 kg	607 615	50 kg 100 kg
								III	E1	619 Y619	100 kg 10 kg	619	200 kg
≠	**Tellurium compound, n.o.s.***	3284	6.1				A3 A5	I II	E5 E4	666 669 Y644	5 kg 25 kg 1 kg	673 676	50 kg 100 kg
								III	E1	670 Y645	100 kg 10 kg	677	200 kg
			☑	☑									
*	**Tetranitromethane**	1510	5.1	6.1				I		FORBIDDEN		FORBIDDEN	
≠	**Tetranitromethane**	1510	6.1	5.1				I		FORBIDDEN		FORBIDDEN	
			☑	☑									
*	**Titanium tetrachloride**	1838	8			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	
≠	**Titanium tetrachloride**	1838	6.1	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2			FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft		Cargo aircraft	
										Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
+	**Toxic by inhalation liquid, corrosive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3492	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, corrosive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3493	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an inhalation toxicity lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3488	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, flammable, corrosive, n.o.s.*** with an inhalation toxicity lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3489	6.1	3 8						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 200 ml/m³ and saturated vapour concentration greater than or equal to 500 LC_{50}	3490	6.1	3 4.3						FORBIDDEN		FORBIDDEN	
+	**Toxic by inhalation liquid, water-reactive, flammable, n.o.s.*** with an inhalation toxicity lower than or equal to 1 000 ml/m³ and saturated vapour concentration greater than or equal to 10 LC_{50}	3491	6.1	3 4.3						FORBIDDEN		FORBIDDEN	
										☑		☑	
*	**Trimethylchlorosilane**	1298	3	8				II	E2	306	1 L	304	5 L
≠	**Trimethylchlorosilane**	1298	3	8				II	E2	352	1 L	377	5 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger aircraft: Packing instruction	Passenger aircraft: Max. net quantity per package	Cargo aircraft: Packing instruction	Cargo aircraft: Max. net quantity per package
	1	2	3	4	5	6	7	8	9	10	11	12	13
	☑									☑		☑	
*	**Vanadium compound, n.o.s.**	3285	6.1				A3 A5	I II III	E5 E4 E1	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Vanadium compound, n.o.s.***	3285	6.1				A3 A5	I II III	E5 E4 E1	666 669 Y644 670 Y645	5 kg 25 kg 1 kg 100 kg 10 kg	673 676 677	50 kg 100 kg 200 kg
+	**Vehicle, fuel cell, flammable gas powered †**	3166	9				A67 A70 A87 A118 A120 A134 A176		E0	FORBIDDEN		951	No limit
+	**Vehicle, fuel cell, flammable liquid powered †**	3166	9				A67 A70 A87 A118 A120 A134 A176		E0	950	No limit	950	No limit
										☑		☑	
*	**Vinyltrichlorosilane**	1305	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	306	1 L	304	5 L
≠	**Vinyltrichlorosilane**	1305	3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3		II	E2	352	1 L	377	5 L

Agenda Item 3: Development of recommendations for amendments to the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) for incorporation in the 2011-2012 Edition

3.1 DRAFT AMENDMENTS TO THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS (DGP/22-WP/16)

3.1.1.1 The need to specify in greater detail the appropriate authority responsible for the transport of dangerous goods by air had been raised at DGP-WG09. A number of members noted that such information was highly desirable, especially when approval for an exemption was sought from other States. However, it was the experience of many, including industry representatives, that it was extremely difficult to obtain this information in many States, frequently resulting in lengthy delays in the processing of exemptions.

3.1.1.2 A proposal to add a new paragraph in the Supplement specifying the detailed contact information required was agreed. A recommendation relating to other involved agencies was also agreed.

3.2 ENFORCEMENT (DGP/22-WP/24)

3.2.1 The panel was invited to consider adding new guidance material addressed to States on the subject of enforcement in the Supplement. Reports of incidents of consignments of dangerous goods failing acceptance checks for very minor reasons, such as the omission of a "." in " n.o.s.", were cited. Cases of regulators levying large fines on operators or handling agents for accepting these types of consignments were also reported. It was suggested that this practice may actually inhibit safety, as a shipper who had gone to the trouble, effort and cost of correctly preparing a shipment only to have it rejected might decide the next time that it would be easier to not declare the dangerous goods at all. A similar issue with the reporting of incidents was reported. The major goals of reporting were to enable people to learn from incidents so as to prevent recurrences and to identify deficiencies in the Technical Instructions. In order for such a scheme to work, it was important to be able to report without fear of retribution due to mistakes the reporter or their company may have made.

3.2.2 There was support for the intent of the proposal; however, concerns were raised that the proposal suggested limitations on the implementation and conduct of States' dangerous goods enforcement programmes. There was particular concern with the last paragraph of the proposal which recommended that States not commence legal proceedings against operators who might report an incident caused by unpremeditated or inadvertent non-compliance with the requirements of the Technical Instructions. It was felt by many that legal proceedings were the prerogative of their State's judicial systems and that it was not within the purview of Annex 18, the Instructions, or the Supplement. The panel was reminded that the material presented was guidance and that nothing would preclude a State from taking whatever corrective actions they deemed necessary. The sentence was amended to further clarify that it was only recommendatory; this was agreed.

3.2.3 Concerns were also expressed with the phrase "minor discrepancies in documentation, marking or labelling should not be considered as a reason for rejecting a consignment". It was felt by some that "minor discrepancy" was a vague term open to interpretation. However, it was noted that this was a term which already existed in Part 7;1 of the Instructions. It was emphasized that compliance

history should always be taken into account, which could perhaps lead to "minor discrepancies" being treated more seriously. The panel agreed that enforcement should be a risk-based activity and that adopting this approach would do much to improve the situation regarding unjustified rejections.

3.2.4 It was noted that ICAO promoted safety management systems (SMS) and that a key component to SMS was an open and robust reporting system. It was recognized that adding the text to the Supplement would provide an excellent direction, particularly for States who might not have a programme.

3.2.5 The proposal, as amended, was adopted.

3.3 CARRIAGE OF DANGEROUS GOODS ON THE MAIN DECK OF PASSENGER AIRCRAFT (DGP/22-WP/30)

3.3.1.1 It was suggested the requirement in S-7;2.2.4 a) stating that all dangerous goods carried on the main deck of a passenger aircraft must be packed in combination packages is inappropriate for a number of permitted dangerous goods. A small amendment to the text was proposed to clarify this requirement.

3.3.1.2 Inconsistencies in the language used in the Spanish text were raised. It was agreed that the Secretariat would address this issue.

3.3.1.3 The proposal was agreed.

3.4 RECOMMENDATION

3.4.1 In light of the foregoing discussions, the meeting developed the following recommendation:

Recommendation 3/1 — Amendment to the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284, Supp)

That the Supplement to the Technical Instructions be amended as indicated in the appendix to the report on this agenda item.

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APPENDIX

PROPOSED AMENDMENTS TO THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS

Part S-1

GENERAL

. . .

Chapter 1

SCOPE AND APPLICABILITY

1.1 DESIGNATION OF NATIONAL AUTHORITY

1.1.1 Each State must designate the appropriate authority within its administration to be responsible for ensuring compliance with Annex 18 — *The Safe Transport of Dangerous Goods by Air* and these Instructions. Details specifying the primary point of contact must be notified to ICAO for publication in the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284) and for dissemination on the public website. As a minimum, these details must include:

a) title (of person or position);

b) address;

c) phone number;

d) facsimile number;

e) e-mail address; and

f) website address (if applicable).

1.1.2 In addition, contact information for other agencies responsible for specific classes (e.g. radioactive material, infectious substances) or for specific actions (e.g. issuance of approvals or exemptions) should be included.

. . .

Editorial Note.— Proposed amendments to Parts S-1, S-3, S-4 and S-7, which relate to approvals and exemptions, are shown in Appendix C to the report on Agenda Item 5.

Part S-7

STATE'S RESPONSIBILITIES

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Chapter 2

STORAGE AND LOADING

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2.2 LOADING ON PASSENGER AIRCRAFT

2.2.1 Part 7;2.1 of the Technical Instructions provides that dangerous goods may only be carried in a main deck cargo compartment of a passenger aircraft that meet the certification requirements for a Class B or C cargo compartment. There may be occasions when there is a need to carry dangerous goods on passenger aircraft that do not have these cargo compartments, such as on those serving remote areas where there is no other transport available. In such circumstances, the State of Origin may approve the transport of dangerous goods in accordance with the following paragraphs.

Note.— Cargo compartment classification is described in the ICAO document Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods *(Doc 9481).*

. . .

2.2.4 The dangerous goods must comply fully with all other applicable requirements of the Technical Instructions and:

a) must be in combination packagings, if the applicable packing instruction provides for such a packing method; and

b) the quantity per package must not exceed that permitted for transport on passenger aircraft according to Table 3-1.

. . .

Chapter 6

ENFORCEMENT

6.1 Part 7;1 of the Technical Instructions requires an operator to conduct an acceptance check on packages containing dangerous goods and their associated documentation to ensure, as far as possible, that the requirements of the Technical Instructions have been met. Generally, operators must not accept dangerous goods for carriage by air if the acceptance check reveals errors in the consignment. However, Note 1 under 7;1 advises that minor discrepancies in documentation, marking or labelling should not be considered as a reason for rejecting a consignment. Experience has shown that rejection of dangerous goods for minor reasons increases the likelihood of the goods being re-presented for carriage undeclared. Consequently, it is recommended that States should not penalize operators and handling agents who accept dangerous goods despite minor discrepancies being noted.

6.2 Part 7;4.4 and 4.5 of the Technical Instructions and Part S-7;4 refer to the reporting by the operator of dangerous goods accidents and incidents, instances of undeclared or misdeclared dangerous goods found in cargo and forbidden dangerous goods discovered in baggage. The primary aim of any incident reporting system should be to further flight safety and not to punish. Consequently States should ensure the free and uninhibited reporting of:

a) dangerous goods accidents and incidents;

b) occasions when undeclared or misdeclared dangerous goods are discovered in cargo; and

c) discoveries of dangerous goods, not permitted under 8; 1.1.2 of the Technical Instructions, in passengers' baggage.

When an operator reports an incident caused by their unpremeditated or inadvertent non-compliance with the requirements of the Technical Instructions, it is recommended that States should not commence legal proceedings against them, except where there has been a dereliction of duty amounting to gross negligence or a report about the occurrence has already been received from another source.

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Agenda Item 4: Amendments to the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481) for incorporation in the 2011-2012 Edition

4.1 EMERGENCY RESPONSE DRILL CODE FOR UN 3291 AND UN 3373 (DGP/22-WP/93)

4.1.1 A proposal to revise the drill code assigned to **Biomedical waste, n.o.s.**, **Clinical waste, unspecified, n.o.s.** and **Medical waste, n.o.s.**, UN 3291 and **Biological substance, Category B**, UN 3373 was presented. It was suggested that the current assignment of 6L was inconsistent with the risk posed by these substances and that "11L" was more appropriate. The proposal was supported and adopted.

4.2 RECOMMENDATION

4.2.1 In light of the foregoing discussion, the meeting developed the following recommendation:

> **Recommendation 4/1 — Amendment to the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481)**
>
> That the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481) be amended as indicated in the appendix to the report on this agenda item.

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APPENDIX

PROPOSED AMENDMENTS TO THE *EMERGENCY RESPONSE GUIDANCE FOR AIRCRAFT INCIDENTS INVOLVING DANGEROUS GOODS*

Section 4

CHART OF DRILLS AND LIST OF DANGEROUS GOODS WITH DRILL REFERENCE NUMBERS

. . .

Amend drill code for the following substances in Table 4-2. Alphabetical List of Dangerous Goods with Drill Codes and Table 4-3. Numerical List of Dangerous Goods with Drill Codes as follows:

UN No.	*Drill Code*	*Proper shipping name*
3291	~~6L~~11L	Biomedical waste, n.o.s.
3291	~~6L~~11L	Clinical waste, unspecified, n.o.s.
3291	~~6L~~11L	Medical waste, n.o.s
3291	~~6L~~11L	Regulated medical waste, n.o.s.
3373	~~6L~~11L	Biological substance, Category B

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Agenda Item 5: Resolution, where possible, of the non-recurrent work items identified by the Air Navigation Commission or the panel:
5.1: Approvals
5.2: Exemptions

5.1 STATE OF ORIGIN APPROVAL (DGP/22-WP/38)

5.1.1.1 At DGP-WG09, a proposal to amend particular parts of the Instructions and the Supplement where reference was made to the granting of an approval by the State of Origin so that approval of the State of the Operator was also required was discussed. It was suggested that without this input, the State of the Operator might not be aware that dangerous goods which are forbidden under normal circumstances are being carried by an operator for which it has regulatory oversight.

5.1.1.2 Those areas of the Technical Instructions and the Supplement that referred to a State of Origin approval were identified, and whether or not it was felt an amendment to include approval by the State of the Operator was necessary was indicated. The panel was asked to review this list and agree to the amendments proposed.

5.1.1.3 The amendments were approved without comment; the work of the group who prepared the proposal was acknowledged with appreciation.

5.2 EXEMPTIONS AND APPROVALS (DGP/22-WP/76) AND FINAL REPORT OF THE APPROVALS AND EXEMPTIONS WORKING GROUP (DGP/22-WP/97)

5.2.1 The panel was provided with a summary of discussions of an informal working group on approvals and exemptions which had taken place immediately before the convening of DGP/22. The group had based its discussions on material presented in DGP/22-WP/76, which provided suggested changes to Annex 18, the Instructions and the Supplement to clarify provisions for exemptions and approvals.

5.2.2 It was reported that the need to clarify provisions for granting exemptions and approvals had been prompted by safety oversight audits results which indicated a lack of established procedures in a number of States. It had been recognized that clarification within Annex 18 and the Instructions as well as guidance to States was necessary to ensure that safe and consistent procedures were applied when considering the granting of exemptions and approvals. It had also been recognized that any new provisions should not impose undue hardship or responsibilities on States which were not equipped to review and issue exemptions and approvals. It was suggested that further consideration be given on how States which did not have the resources to review and approve these authorizations could notify ICAO through the audit program and through corrective action plans.

5.2.3 The group clarified the applicability of approvals and exemptions by adding text to the Scope and Applicability Chapter of Part 1 of the Instructions. “Exemption” was amended in order to clearly indicate that a relief from the requirements was not being provided but rather an allowance for an alternate means of compliance provided an equivalent level of safety would be met. It was noted that it was the responsibility of the applicant to demonstrate the necessary safety level and not the State. While

considering amendments to the definitions, the group suggested changes to the conditions of Special Provisions A1 and A2, specifically to remove from A2 the authorization to approve the transport on passenger-carrying aircraft. Based on this decision, dangerous goods assigned A109 would then be assigned A2 allowing A109 to be deleted.

5.2.4 Finally, to assist in training, the group felt it necessary to clarify how exemptions and approvals apply within the scope of the Technical Instructions. Text was developed explaining that the shipper would first apply the detailed provisions of the Technical Instructions. If an approval reference was provided within the Instructions, the relevant States could then be asked to grant an approval. Only when the detailed provisions of the Instructions could not be used and in the absence of an approval reference could States consider granting an exemption.

5.2.5 The panel reviewed amendments proposed by the group to Annex 18, the Technical Instructions, and the Supplement to the Technical Instructions which addressed the issues raised. These were approved, subject to some editorial amendments. The work of the group who prepared the proposal was acknowledged with appreciation**.**

5.3 RECOMMENDATIONS

5.3.1 In light of the foregoing discussions, the meeting developed the following recommendations:

RSPP

Recommendation 5/1 — Amendment to Standards related to approvals and exemptions in Annex 18

That Standards related to approvals and exemptions in Annex 18 be amended as indicated in Appendix A to the report on this agenda item.

Recommendation 5/2 — Amendment to provisions related to approvals and exemptions in the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284)

That provisions related to approvals and exemptions in the Technical Instructions be amended as indicated in Appendix B to the report on this agenda item.

Recommendation 5/3 — Amendment to provisions related to approvals and exemptions in the *Supplement to the Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284, Supp)

That provisions related to approvals and exemptions in the Supplement to the Technical Instructions be amended as indicated in Appendix C to the report on this agenda item.

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

5.3: Review of provisions for dangerous goods relating to batteries:

a) lithium batteries

b) battery-powered devices

c) battery-powered mobility aids

5.4 REVIEW OF PROVISIONS FOR DANGEROUS GOODS RELATING TO BATTERIES

5.4.1 Lithium Battery Powered Mobility Aids (DGP/22-WP/22)

5.4.1.1 Work had been done during DGP-WG08 and DGP-WG09 to clarify the passenger provisions for battery powered mobility aids so that both spillable and non-spillable lead acid batteries were treated consistently. A proposal to extend the passenger and crew provisions in Part 8 of the Instructions to include lithium battery powered mobility aids was discussed.

5.4.1.2 It was noted that the intent of the provision was to allow wheelchairs or similar aids for passengers with impaired mobility. The term "mobility aid", however, could be interpreted to include many battery-powered consumer articles such as golf carts and bicycles. This could potentially result in the carriage of lithium batteries in mobility aids with no Wh limit; although this might be appropriate for a person dependent on their wheelchair for mobility, it was questioned whether the same could be said for a person wishing to travel with their battery-powered bicycle. It was noted that such a battery could be carried in baggage without the marking, labeling, documentation or packing requirements which would apply if it was to be transported as cargo. Alternate wording was proposed to address this issue.

5.4.1.3 There was concern with a provision for spare batteries; it was suggested that these could be quite large. It was agreed to remove this provision. The structure of a requirement for batteries to have met UN testing criteria was changed so that the burden of proof was removed from the passenger and placed on the manufacturer of the wheelchair. It was noted that a recommendation that passengers make advance arrangements with each operator had been applied to spillable battery-powered mobility aids; it was agreed that this recommendation should also be applied to both lithium battery powered and non-spillable battery-powered devices.

5.4.1.4 The proposal was agreed as amended. It was agreed the new wording would be reflected in the provisions for spillable and non-spillable batteries.

5.4.2 Liquid Cathode Batteries Forbidden for Transport in the Technical Instructions (DGP/22-WP/32)

5.4.2.1 A proposal to remove a prohibition on certain liquid cathode batteries was discussed. It was suggested that this proposal was justified on the basis the original restriction was based on old liquid cathode technologies which caused hazardous behaviour. It was reported that manufacturers had made significant improvements to their cell and battery designs since the late 1970's and that lithium battery tests in the UN *Manual of Tests and Criteria* had been updated so that they ensure cell and battery designs do not have the weaknesses that were found in the old designs from the 1970s. The proposal was agreed.

5.4.3 **Prototype and low production lithium batteries (DGP/22-WP/33)**

5.4.3.1 A proposal to amend Special Provision A88 to allow a mass exceeding 35 kg G was discussed. The proposal was originally raised at DGP-WG09 and had been agreed to in principal subject to several editorial issues being addressed.

5.4.3.2 A new proposal was made to delete the limitation of "not more than 24 cells or 12 batteries per packaging" in order to simplify Special Provision A88 and to align it with the UN Model Regulations (Special Provision in 310). It was argued that appropriate national authorities would still be able to limit the number of cells and batteries per package through the approval process if it was deemed to be appropriate. This was agreed. It was also agreed that a requirement for a copy of the approval showing the limitations accompany the consignment be added.

5.4.3.3 The proposal, as modified, was agreed.

5.4.4 **Packaging Requirements For Lithium Batteries Contained in Equipment (DGP/22-WP/45)**

5.4.4.1 It was suggested that the structure of the lithium battery instructions made the content unclear and a proposal for restructuring was made. General support to enhance clarity was given but it was suggested a thorough review by a working group during the meeting would be necessary. The working group returned later in the meeting with a new proposal addressing the comments of the panel.

5.4.4.2 It was suggested that repeating the general requirements which apply to both the fully regulated Class 9 batteries in Section I and the "excepted" batteries in Section II was redundant and should be moved to the top of each packing instruction. Although this received some support, it was agreed that there was value in maintaining the information in both places so that each section could be used as a standalone document.

5.4.4.3 A requirement was added which was agreed at DGP/21 but which was inadvertently omitted whereby when shipping excepted batteries, the packing instruction number and a statement indicating that they are not restricted must be shown on the air waybill when one is being used.

5.4.4.4 It was agreed that a provision in Section I of Packing Instructions 967 and 970 which requires "waterproof packaging" for lithium batteries contained in equipment could be removed. No justification could be identified to keep the provision, as it did not appear in the Model Regulations or in Section II of Packing Instruction 967 and 970.

5.4.4.5 It was noted that the provision forbidding batteries being returned to the manufacturer for safety reasons from transport appeared in Section II only. It was added to Section I of the packing instructions. The new provision forbidding transport of lithium batteries being sent for recycling (DGP/22-WP/96) was also added to Sections I and II of Packing Instructions 965 and 968.

5.4.4.6 The panel agreed to the amendments proposed. A number of editorial amendments which clarified the provisions were also agreed.

5.4.5 Dimension for Lithium Battery Handling Label (DGP/22-WP/53)

5.4.5.1 The panel was reminded of a proposal at DGP-WG09 to reduce the minimum dimension for the lithium battery handling label to accommodate smaller packages used for transporting consumer-type lithium ion and lithium metal cells and batteries. Most members felt that the proposed size was too small and did not support the proposal as written. Some sympathy was expressed for the suggestion of an area limit with certain minimum dimensions or for a smaller label, recognizing that for smaller packages, this might be appropriate.

5.4.5.2 A new proposal providing two optional dimensions for the handling label (55 × 130 mm or 74 × 105 mm) in addition to the existing label size was presented. There was general support for the proposal although there was concern that the text provided was vague in that it would be difficult to interpret "small or retail packages". It was suggested that the text provided in provisions for the infectious substances handling label, i.e. "when the packages are of dimensions such that they can only bear smaller labels", would be less vague and more suitable. There was, however, opposition to providing provision for a second smaller dimension; it was agreed that only the 74 × 105 mm dimension would be offered as an alternative. The proposal, as amended, was adopted.

5.4.6 Lithium Batteries that Exceed 35 kg Contained in/Packed with Equipment (DGP/22-WP/56)

5.4.6.1 The panel was reminded of Special Provision A99 which provides for **Lithium metal batteries** (UN 3090) and **Lithium ion batteries** (UN 3480) that exceed the 35 kg G amount shown in column 13 of Table 3-1 to be carried on cargo aircraft with the approval of the State of Origin. It was reported that lithium batteries which exceed 35 kg G are sometimes fitted to items of equipment or need to be shipped with pieces of equipment. Special Provision A99 does not apply to UN 3091, **Lithium metal batteries contained in equipment** or UN 3481, **Lithium ion batteries contained in equipment** and therefore such items cannot be carried on cargo aircraft unless exemptions have been granted by the various States concerned. It was suggested that this is excessive and that similar provisions should apply as for UN 3090 and UN 3480 on cargo aircraft. An amendment extending the provisions of Special Provision A99 to UN 3091 and UN 3481 was therefore proposed. This was agreed.

5.4.7 Lithium Batteries and Equipment Containing Lithium Batteries (DGP/22-WP/60)

5.4.7.1 A proposal to increase the 35 kg mass limitation for shipments consisting of one lithium battery or a single piece of equipment containing lithium batteries was discussed. The proposal was originally discussed at DGP-WG09. The working group was provided with a description of the high levels of safety features of large lithium batteries. It was noted during those discussions that the 35 kg limit for small batteries was appropriate and if this restriction were to be removed, it would allow much bigger packages of larger batteries or larger aggregates of batteries. However, there also was recognition that a higher limit might be considered, especially if environmental issues raised were taken into account.

5.4.7.2 A new proposal was presented to the panel based on discussions with automotive and lithium battery manufacturers. If adopted, a provision would allow for consignments of one battery, or batteries contained in one piece of equipment, with a battery net mass of up to 400 kg to be transported on cargo aircraft provided all other requirements of the Technical Instructions were met. It was suggested that the proposal was generally consistent with current requirements for items consigned under UN 3171,

Battery-powered equipment or **Battery-powered vehicle**. It was argued that the need to transport large lithium batteries had become more prevalent as they were being developed as a solution to global warming issues with the objective of reducing dependency on fossil fuels. There had also been a significant increase in their use in many military, aerospace and stationary applications.

5.4.7.3 There was little support for this proposal. There was sympathy for the need to transport these batteries; however, it was felt that there were no additional safety requirements in the special provision which could justify this. It was noted that the proposal just adopted (see paragraph 5.4.6) would provide for shipment of these large lithium batteries subject to approval by the State of Origin. It was argued that when batteries had to be tested in multiple States, multiple approvals were required which was placing a burden on the industry.

5.4.7.4 The panel was reminded of a UN working group which had been established to update the lithium battery tests in the UN *Manual of Tests and Criteria*. It was suggested that the proposal could be re-visited once the work of this group was complete. The proposal was withdrawn.

5.4.8 Enhanced Requirements for the Transport of Lithium Batteries (DGP/22-WP/62 and DGP/22-IP/4)

5.4.8.1 The panel was provided with a link to a list compiled by one State of incidents related to batteries and battery-powered devices which had occurred since March 1991. All of the incidents involved smoke, fire, extreme heat or explosion. It was reported that over forty of these incidents involved lithium batteries and devices powered by lithium batteries. It was felt that these incidents demonstrated the potential for a significant fire event while in flight which implied a serious safety issue.

5.4.8.2 A brief summary of the most recent incidents involving lithium batteries in cargo was provided. After significant discussion by the panel it was suggested that, with the exception of one incident which was still under investigation, the shipments involved in these incidents appeared to not be in compliance with the existing requirements of the Instructions. The review of these incidents highlighted a need for more aggressive enforcement of safety provisions already in place and for educating the public.

5.4.8.3 The meeting was briefed on some of the efforts being undertaken in one State to provide outreach and to educate industry and the public regarding the requirements that are currently in place. A public awareness campaign aimed at the public, airlines, ticketing agents, industry, etc. had been initiated. Other members agreed that outreach was extremely important and reported on initiatives in their own States, including symposiums, forums, and working together with industry.

5.4.8.4 An effective oversight program which results in compliance from manufacturers, testers, shippers and recyclers was also mentioned as an important tool for identifying and reducing the potential for battery transport incidents. One of the difficulties identified was that many shippers were unaware that batteries were considered dangerous goods; often, the only way non-compliance was discovered was once an incident had taken place. Surveys circulated to manufacturers and distributors were being used as one tool to identify these shippers. Providing worksheets to inspectors, visiting battery facilities, checklists on granting approvals, public information, and press releases were cited as tools to help prevent the need for enforcement. If enforcement was necessary, a balance between strict enforcement and remedial actions for shippers who honestly did not know that batteries were regulated was important.

5.4.8.5 Concern was expressed that no matter how extensive outreach and oversight initiatives were, nominated DGP members covered only seventeen States. It was suggested that a State letter highlighting the need for outreach and providing guidance on the safe handling of lithium batteries could be issued to reach all Member States. It was agreed that such a letter would be drafted by a working group by correspondence.

5.4.8.6 It was recognized that a cooperative global effort was key to enforcing awareness, ensuring compliance and ultimately enhancing safety by reducing the likelihood of future incidents.

5.4.9 Special Provision for Lithium Cells and Batteries Packed with or Contained in Equipment (DGP/22-WP/70)

5.4.9.1 The possibility of a package containing a combination of lithium batteries contained in equipment and lithium batteries packed with equipment and the ensuing difficulties in assigning a proper shipping name was discussed. Although it was understood that in such a situation the "packed with equipment" version of the proper shipping name should apply, it was felt that this was not clearly stated in the Instructions. A new special provision was proposed to clarify this. It was noted that the possibility of a package containing both lithium ion and lithium metal batteries also resulted in confusion, as did button cells. A working group set up to review restructured lithium battery packing instructions (see paragraph 5.4.4) revised the proposed special provision by indicating that packages containing lithium metal and lithium ion batteries must be marked as required for both but that marking was not required for button cell batteries installed in equipment. The new special provision was agreed.

5.4.10 Medical Aid Containing Lithium Batteries (DGP/22-WP/75)

5.4.10.1 A proposal to add medical devices containing lithium batteries to the passenger and crew provisions of Part 8 was considered. There was general support for the intent of the proposal; however, there were queries related to the size of the batteries and the lithium content. The original proposal specified a lithium content limit of 2 grams; however, the limit was increased to 8 grams after it was reported that most automated external defibrillators (AED) had a lithium content between 4 and 8 grams. Some members were concerned that this new limit was significantly larger than the original proposed; others felt that this was not a concern since the provision was subject to the approval of the operator. It was also suggested that an optional requirement to carry spare batteries in carry-on baggage should be made mandatory.

5.4.10.2 A new proposal was presented addressing comments raised. It was agreed that the term "lithium alloy" was unnecessary in the passenger provisions as it was a subset of "lithium metal" already mentioned. Emphasis that the devices had to be carried by passengers for medical use, a specification that no more than two spare batteries were permitted, and a requirement for each installed or spare battery to have passed tests in the UN *Manual of Tests and Criteria* were added. In addition, the requirement to carry spare batteries in carry-on baggage was mandated.

5.4.10.3 The proposal was agreed, subject to a consequential amendment to align the new provision with 8;1.1 q).

5.4.11 **Battery Powered Equipment (UN 3171), Lithium Ion Batteries Contained in Equipment (UN 3481) and Lithium Metal Batteries Contained in Equipment (UN 3091) (DGP/22-WP/79)**

5.4.11.1 It was suggested that a loophole existed in the requirements for batteries whereby it would be possible to ship lithium batteries (both ion and metal) under UN 3171, **Battery-powered equipment**, despite it not having the safeguards provided for under UN 3481, **Lithium ion batteries contained in equipment** and UN 3090, **Lithium metal batteries contained in equipment**. It was felt that it should not be permissible for lithium batteries contained in equipment to be consigned for transport as UN 3171. A new special provision was proposed to establish this prohibition. The question of whether or not a bicycle containing a lithium battery would be covered under this new provision or whether it could be considered a vehicle was raised. It was suggested that similar ambiguities might exist with other types of equipment/vehicles and that this issue could be considered in the future work of the panel. The proposal was agreed

5.4.12 **Gross Weight when Packing Instruction has a Net Quantity Limitation (DGP/22-WP/80)**

5.4.12.1 An anomaly between what quantity limitations are imposed in the packing instructions for lithium batteries when packed in equipment and what is required on the dangerous goods transport document was reported. It was noted that lithium batteries and cells (ion and metal), when packed with equipment, have a net quantity limitation imposed by the packing instruction, i.e. the quantity (mass) of battery(ies) per "overpack." However, Part 5;4.1.5.1 e) requires that such articles be identified on the dangerous goods transport document with a gross mass. Without imposing additional requirements on the shipper, the operator is unable to check whether the quantity limitation(s) per overpack had been complied with. An amendment to the indication of quantity requirements on the dangerous goods transport document for lithium batteries when packed with equipment was proposed to address this anomaly. The amendment was adopted.

5.4.13 **Provision of Information for Battery Shipments (DGP/22-WP/88)**

5.4.13.1 A proposal to introduce a new requirement for information specific to battery shipments to be placed at cargo acceptance points was discussed. The proposal was prompted by reports of over 100 battery incidents involving smoke, fire, extreme heat or explosion. It was suggested that many of these incidents were the result of shipments not prepared in accordance with the provisions of the Instructions. It was proposed that guidance relative to battery shipments be required at all cargo acceptance points as a means to increase awareness of the requirements of the Instructions and improving compliance. The proposal included two requirements: one for visual examples of dangerous goods, including batteries, and the second for information specific to the proper preparation of shipments containing batteries.

5.4.13.2 Although there was support for the requirement that visual examples of dangerous goods include batteries, there was none for more specific information related to the proper preparation of shipments containing batteries. It was felt by many that it was not the responsibility of the operator to provide information to shippers on preparing shipments and that making this a requirement might impose a liability on the operator if a shipper did not comply. Additionally, non-language specific information was a philosophy which should be maintained when providing visual displays.

5.4.13.3 The proposal to require visual examples of dangerous goods, including batteries, was agreed. It was also agreed that a transition period would be provided, allowing for the use of existing visual information until the end of 2011.

5.4.14 **Class 9 Lithium Ion Battery Shipments (DGP/22-WP/89)**

5.4.14.1 A proposal to limit the quantity of lithium ion batteries assigned to Class 9 in a single cargo compartment was discussed. It was reported that research by the United States Federal Aviation Administration (FAA) had shown that a fire involving a single battery would likely spread to all batteries in a shipment, increasing the severity of a fire. Accordingly, the Unites States National Transportation Safety Board (NTSB) recommended that the quantity of lithium batteries be limited at any single location.

5.4.14.2 It was suggested that since the testing was performed on batteries without the benefit of the required packaging, this conclusion was not representative of the effects on a package of batteries in transport. It was also suggested that the number of lithium batteries in a single location was not as important as how they are packaged. It was felt that there was no data available to evaluate a limit at this time. The proposal was not supported.

5.4.15 **Lithium Ion Batteries (DGP/22-WP/90 and DGP/22-IP/8) and Lithium Metal Batteries (DGP/22-WP/91 and DGP/22-IP/8)**

5.4.15.1 Proposals to eliminate exceptions for lithium ion and lithium metal batteries and an additional proposal to prohibit carriage of lithium metal batteries except when installed in equipment were presented. An additional proposal to limit the number of packages of lithium ion batteries that could be offered in a single consignment prepared according to Section II of packing instructions for lithium ion batteries (including when packed in or with equipment) was also presented. The proposals were prompted by lithium battery incidents involving fire aboard aircraft which had been reported since the new provisions for lithium batteries became effective (1 January 2009).

5.4.15.2 A presentation supporting the proposals was given. The presentation used safety management systems (SMS) principles to establish the risk associated with transporting lithium batteries. It was argued that the severity of a lithium battery fire increases with the number of batteries at a single location, and that the risk presented by large shipments of lithium batteries represented an “unacceptable risk under the existing circumstances”. It was also argued that SMS principles demanded that action be taken to limit the number of batteries at a single location in order to mitigate this risk.

5.4.15.3 The proposal to eliminate exceptions for lithium ion batteries was presented separately to the proposal to eliminate exceptions for lithium metal batteries and to prohibit their carriage except when installed in equipment. Likewise, they are reported on separately below.

Lithium ion batteries

5.4.15.4 Tests conducted in one State had indicated that a fire involving a single battery (unpackaged) would likely spread to all batteries in a shipment, increasing the severity of a fire. It was felt that the fire risk posed by lithium ion batteries in transportation was sufficient for them to be fully regulated as Class 9. It was suggested that full regulation would increase the safety of shipments, simplify the regulations, and consequently improve compliance with the provisions of the Technical Instructions.

5.4.15.5 Although there was some support for this proposal, the majority did not agree. It was suggested that the recent instances involved lithium battery shipments that were not in full compliance with the Instructions. Many felt that fully regulating the batteries would increase occurrences of undeclared dangerous goods instead of improving compliance. It was argued that non-compliance was more often due to unawareness than to negligence and that awareness would be improved with full regulation. Although all agreed that outreach, oversight and enforcement were critical, it was argued that years of outreach had not improved compliance; the provisions were complicated and eliminating the exceptions would simplify the system making compliance easier to obtain. It was felt by many that much work had been done to improve safety and that the new requirements had been in place for less than two years. Much effort had already been invested in educating people, and experience had shown that numerous revisions to regulations often had negative affects.

5.4.15.6 Most of the incidents were reported by one State and it was suggested that this State had not fully adopted the requirements of the Instructions, while incidents were not reported in States which had adopted them. It was argued that there were incidents in other States and that the apparent lack of incidents was due to a lack of reporting. It was explained that the regulations had not been fully adopted in the State which reported the incidents because that State already prohibited the carriage of lithium metal batteries on passenger-carrying aircraft except under certain strict conditions and that State was considering additional national regulations since they did not feel the Instructions provided for an acceptable level of safety.

5.4.15.7 The panel agreed that non-compliance needed to be addressed and that testing was an area which needed additional focus as it was difficult to prove whether or not a battery had met testing requirements. It was reported that a working group had been established at the UN to address this issue.

5.4.15.8 In the absence of support for the proposal to eliminate exceptions for lithium ion batteries, an alternative proposal to limit the number of packages offered in a single consignment was presented. Since there was no support for either proposal, they were withdrawn.

Lithium metal batteries

5.4.15.9 The arguments for and against removing exceptions for cargo shipments of lithium metal batteries were similar to those presented for lithium ion. It was additionally reported that testing indicated Halon fire suppression systems installed on aircraft had no effect on fire involving lithium metal batteries. For this reason, it was suggested the fire risk posed by lithium metal batteries was even greater than that posed by lithium ion, and forbidding their transport when not installed in equipment was justified.

5.4.15.10 All agreed that there is a concern for fires caused by batteries; however, there were different opinions on how to address this concern. Without improved packaging to protect the batteries from damage or an external fire, a ban was considered the best option by some. However, others felt that this would increase the likelihood of undeclared consignments, resulting in a negative impact on safety. The importance of outreach was agreed by all as was the need for improved reporting. This was something which could also be addressed in the State letter which the panel had earlier agreed should be developed (see paragraph 5.4.8.4).

5.4.15.11 Some members felt that the test results cited were not relevant since the testing was not conducted on batteries prepared for shipment according to the requirements of the Instructions. Others felt that this had no bearing on the outcome; the test results indicated that even if the fire was suppressed, the temperature was high enough to make the batteries ignite without a flame. It was noted that the testing

was done prior to the introduction of the new requirements for lithium batteries in the Instructions. Testing on packagings meeting these new requirements was considered by many to be the appropriate way of determining whether or not the requirements were adequate.

5.4.15.12 The lack of support for the proposal to forbid the carriage of lithium metal batteries on passenger aircraft prompted the development of a new proposal requiring additional packing requirements when consigning lithium metal batteries for passenger aircraft under the provisions of Section II in Packing Instructions 968 and 969. It was proposed that the rigid metal packaging requirement for lithium metal batteries in Section I of Packing Instructions 968 and 969 should also be adopted in Section II. This would provide protection for these batteries from damage and shield them from the heat of a suppressed fire.

5.4.15.13 Before making a decision, the panel was again asked to consider the test results indicating that a fire involving lithium metal batteries could not be extinguished using Halon fire suppression systems, and that the heat from a suppressed cargo fire would be sufficient to ignite a shipment of lithium metal batteries. A second presentation was given whereby tests conducted in another State suggested that a fire would not spread to other cells if the batteries were packed properly.

5.4.15.14 There was some support for this proposal in that it would result in a higher standard for passenger aircraft on the basis that the safety benefits would outweigh any potential complications for industry. It was recalled, however, that the panel had considered such a proposal at DGP/21 and it was not adopted. It was suggested that a requirement for rigid metal packaging would result in a ban on passenger aircraft due to the permitted weight; although this would be welcomed by some, others felt that this would be excessive. There was a concern expressed that industry had made changes to packaging in order to accommodate a 2.5 kg limit; it was reported by an industry member, however, that this was not the case. Instead of using smaller package sizes, they had instead chosen to comply with Class 9.

5.4.15.15 The proposal was not supported; the panel was reminded, however, of the ICAO fast-track mechanism for adopting safety-related amendments. Should further information become available which would justify such a proposal, it could be addressed ahead of the normal amendment cycle.

5.4.16 PROHIBITION ON AIR TRANSPORT OF LITHIUM BATTERIES BEING SENT FOR RECYCLING (DGP/22-WP/96)

5.4.16.1 A number of incidents had been reported where lithium batteries being shipped for recycling caught fire. Although these batteries may not have been compliant with the requirements of the Instructions, it was suggested that they may nevertheless pose a higher risk to safety and that prohibiting them from transport by air should be considered. It was felt that these batteries may have an unknown origin and may have been subject to damage or abuse that could affect the normal safety features that prevent thermal runaway.

5.4.16.2 While there was support for the intent of this proposal it was felt that more consideration had to be given before adopting it. Some felt that batteries contained in equipment should also be addressed in the proposal; others felt there was less likelihood of recycling equipment and that even if they were recycled, the batteries would be provided additional protection by the equipment. It was suggested that other types of batteries and batteries being disposed of should be included in the prohibition.

5.4.16.3 A new proposal was developed addressing the issues raised. It was agreed that the special provision should apply to all battery types, including those shown in light-type in Table 3-1. It was felt, however, that there was no justification to apply the special provision to battery-powered equipment. It was also agreed to provide for the transport of batteries being sent for recycling with the approval of the appropriate national authority of the State of Origin and the State of the Operator.

5.4.16.4 The proposal, as amended, was agreed.

5.5 RECOMMENDATION

5.5.1 In light of the foregoing discussions, the meeting developed the following recommendation:

Recommendation 5/4 — Amendment to lithium battery provisions in the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284)

That provisions related to lithium batteries in the Technical Instructions be amended as indicated in Appendix D to the report on this agenda item.

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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

5.6 REQUIREMENTS FOR INNER PACKAGINGS (DGP/22-WP/94)

5.6.1 Revisions to the provisions applicable to inner packagings as set out in Part 6, Chapter 3 of the Instructions as a consequence of the adoption of the reformatted packing instructions were proposed.

5.6.2 The panel was reminded that when adopting the reformatted packing instructions, it was agreed that inner packagings would no longer be referred to by IP codes and instead the terminology would be aligned with the Model Regulations; inner packagings would simply be identified by the material from which they are manufactured. IP codes for aerosols, however, would be retained as there is a need to differentiate between metal aerosols (IP.7A and IP.7B) and plastic aerosols (IP.7C), and a number of packing instructions identify specific conditions based on the type of metal aerosol. It was noted that while all of the packing instructions for Classes 3, 4, 5, 8, 9 and Division 6.1 had 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 had not yet been agreed.

5.6.3 It was reported that the Model Regulations contain no requirements for inner packagings along the lines of that contained in 6;3.2 of the Technical Instructions.

5.6.4 The amendments proposed were agreed.

5.7 RECOMMENDATION

5.7.1 In light of the foregoing discussions, the meeting developed the following recommendation:

> **Recommendation 5/5 — Amendment to the reformatted packing instructions in the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284)**
>
> That provisions related to the reformatted packing instructions in the Technical Instructions be amended as indicated in Appendix E to the report on this agenda item.

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Agenda Item 5: Resolution, where possible, of the non-recurrent work items identified by the Air Navigation Commission or the panel:
5.5 Carriage of dangerous goods on helicopters

5.8 THE CARRIAGE OF DANGEROUS GOODS BY HELICOPTERS (DGP/22-WP/57)

5.8.1 The subject of the lack of specific provisions for the carriage of dangerous goods by helicopters was discussed at DGP-WG08 and DGP-WG09. Based on these discussions, material indicating suggested areas of helicopter operations which could be addressed in either Annex 18, the Instructions, or the Supplement was presented. It was suggested that anything related to routine helicopter operations should be addressed within the relevant parts of the Technical Instructions while anything considered to relate to specialized operations that may require specific approval or exemption by the States concerned should be addressed in the Supplement.

5.8.2 It was agreed that there are many issues unique to the transport of dangerous goods by helicopters which need to be addressed. It was recognized that many helicopter operations are specialized ones with practical problems which might make compliance difficult. It was agreed that coordination with Annex 6 — *Operation of Aircraft* would be necessary.

5.8.3 There was much support for continuing this work within a working group. It was agreed this would be done during the next biennium.

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APPENDIX A

PROPOSED AMENDMENTS TO STANDARDS RELATED TO APPROVALS AND EXEMPTIONS IN ANNEX 18

ANNEX 18

THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

. . .

CHAPTER 1. DEFINITIONS

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Approval. An authorization granted by an appropriate national authority for:

a) the transport of dangerous goods identified in the Technical Instructions as forbidden for transport under normal circumstances but which may be transported with the approval of the State of Origin and the State of the Operator; or

b) other purposes as specified in the Technical Instructions.

Note.— In the absence of a specific reference allowing the granting of an approval, the provision of an exemption applies.

. . .

Exemption. An authorization ~~issued~~ granted by an appropriate national authority ~~providing relief from the provisions of this Annex~~ to:

a) permit the transport of dangerous goods identified in the Technical Instructions as forbidden for transport under normal circumstances, unless the provisions of the Technical Instructions indicate they may be transported under an approval granted by the State of Origin and the State of the Operator;

b) provide an alternative means of compliance with the provisions of the Technical Instructions.

. . .

Technical Instructions. The *Technical Instructions for the Safe Transport of Dangerous Goods by Air* (Doc 9284), approved and issued periodically in accordance with the procedure established by the ICAO Council.

. . .

CHAPTER 2. APPLICABILITY

2.1 General applicability

2.1.1 The Standards and Recommended Practices of this Annex shall be applicable to all international operations of civil aircraft.

2.1.2 Where specifically provided for in the Technical Instructions, the States concerned may grant an approval:

a) to transport dangerous goods forbidden on passenger and/or cargo aircraft where the Technical Instructions state that such goods may be carried with an approval; or

b) for other purposes as specified in the Technical Instructions;

provided that in such instances an overall level of safety in transport which is at least equivalent to the level of safety provided for in the Technical Instructions is achieved.

2.1.3 In ~~cases~~ instances of extreme urgency or when other forms of transport are inappropriate or full compliance with the prescribed requirements is contrary to the public interest, the States concerned may grant an exemption~~s~~ from the~~se~~ provisions of the Technical Instructions provided that in such ~~cases~~ instances ~~every effort shall be made to achieve~~ an overall level of safety in transport which is at least equivalent to the level of safety provided ~~by these provisions~~for in the Technical Instructions is achieved. For the State of Overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.

Note 1.— For the purposes of exemptions, "States concerned" are the States of Origin, Operator, Transit, Overflight and Destination.

Note ~~1~~2.— For the purpose of approvals, ~~The~~ "States concerned" are the States of Origin~~,~~ and the Operator ~~transit, overflight and destination of the consignment and the State of the Operator~~.

~~*Note 2. — Refer to 4.2 for dangerous goods normally forbidden for which States may grant an exemption.*~~

Note 3.— Refer to 4.3 for dangerous goods forbidden for transport by air under any circumstances.

Note 4.— It is not intended that this Annex be interpreted as requiring an operator to transport a particular article or substance or as preventing an operator from adopting special requirements on the transport of a particular article or substance.

2.2 Dangerous Goods Technical Instructions

2.2.1 Each Contracting State shall take the necessary measures to achieve compliance with the detailed provisions contained in the Technical Instructions ~~*for the Safe Transport of Dangerous Goods by Air* (Doc 9284), approved and issued periodically in accordance with the procedure established by the ICAO Council~~. Each Contracting State shall also take the necessary measures to achieve compliance with any amendment to the Technical Instructions which may be published during the specified period of applicability of an edition of the Technical Instructions.

. . .

CHAPTER 4. LIMITATION ON THE TRANSPORT OF DANGEROUS GOODS BY AIR

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4.2 Dangerous goods forbidden for transport by air unless exempted

The dangerous goods described hereunder shall be forbidden on aircraft unless exempted by the States concerned under the provisions of 2.1 or unless the provisions of the Technical Instructions indicate they may be transported under an approval ~~issued~~ granted by the State of Origin:

a) ~~articles and substances~~ dangerous goods that are identified in the Technical Instructions as being forbidden for transport in normal circumstances; and

b) infected live animals.

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APPENDIX B

PROPOSED AMENDMENTS TO PROVISIONS RELATED TO APPROVALS AND EXEMPTIONS IN THE *TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR*

Part 1

GENERAL

. . .

Chapter 1

SCOPE AND APPLICABILITY

. . .

1.1 GENERAL APPLICABILITY

1.1.1 These *Technical Instructions for the Safe Transport of Dangerous Goods by Air*, referred to herein as the "Instructions", prescribe the detailed requirements applicable to the international civil transport of dangerous goods by air. Any addenda to this edition of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* issued by ICAO constitute part of these Instructions.

1.1.2 Where specifically provided for in these Instructions, the State of Origin and the State of the Operator may grant an approval:

a) to transport dangerous goods forbidden on passenger and/or cargo aircraft where these Instructions state that such goods may be carried under an approval; or

b) for other purposes as specified in these Instructions;

provided that in such instances an overall level of safety in transport which is at least equivalent to the level of safety provided for in these Instructions is achieved.

1.1.2 In ~~cases~~ instances of extreme urgency~~,~~ or when other forms of transport are inappropriate~~,~~ or full compliance with the prescribed requirements is contrary to public interest, the States concerned may grant an exemption~~s~~ from the provisions of the Instructions provided that in such ~~cases~~ instances ~~every effort is made to achieve~~ an overall level of safety in transport~~,~~ which is at least equivalent to the level of safety provided ~~by~~ for in these Instructions is achieved. For the purposes of exemptions, ~~The~~ "States concerned" are the States of Origin, Operator, transit, overflight and destination ~~of the consignment, and the State of the Operator~~. For the State of overflight, if none of the criteria for granting an exemption are relevant, an exemption may be granted based solely on whether it is believed that an equivalent level of safety in air transport has been achieved.

Note ~~1~~.— Refer to 1;2.1 for dangerous goods forbidden for transport by air under any circumstance.

~~*Note 2.— Unless otherwise provided for, exemptions may be granted to permit the carriage of dangerous goods that are identified in columns 10 and 11 or 12 and 13 of the Dangerous Goods List (Table 3-1) as being forbidden. Exemptions may also concern other parts of the Technical Instructions.*~~

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Chapter 3

GENERAL INFORMATION

Parts of this Chapter are affected by State Variation BE 1; see Table A-1

3.1 DEFINITIONS

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Approval. An authorization ~~issued~~ granted by the appropriate national authority for:

a) transport of those entries listed in Table 3-1 as forbidden on passenger and/or cargo aircraft to which Special Provision A1~~,~~ or A2 ~~or A109~~ has been assigned in column 7; or

b) other purposes as specified in these Instructions.

~~*Note.— Unless otherwise indicated, approval is only required from the State of Origin.*~~

. . .

Exemption. An authorization ~~issued~~ granted by an appropriate national authority ~~providing relief from the provisions of these Instructions~~ to:

a) permit the transport of dangerous goods identified in these Instructions as forbidden for transport as cargo under normal circumstances, unless the provisions of these Instructions indicate they may be transported under an approval granted by the State of Origin and the State of the Operator; or

b) provide an alternative means of compliance with the provisions of these Instructions.

Note.— The requirements for exemptions are given in 1;1.1.2.

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Part 2

CLASSIFICATION OF DANGEROUS GOODS

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Chapter 6

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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6.3 DIVISION 6.2 — INFECTIOUS SUBSTANCES

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6.3.6 Infected live animals

6.3.6.1 A live animal that has been intentionally infected and is known or suspected to contain an infectious substance must not be transported by air unless the infectious substance contained cannot be consigned by any other means. Infected live animals may only be transported under terms and conditions ~~approved~~ of an approval granted by the appropriate national authority.

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Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

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Chapter 2

ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

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2.1 ARRANGEMENT OF THE DANGEROUS GOODS LIST (TABLE 3-1)

2.1.1 The Dangerous Goods List (Table 3-1) is divided into 13 columns as follows:

. . .

Column 11 "Passenger aircraft — Maximum net quantity per package" — this column shows the maximum net quantity (mass or volume) of the article or substance allowed in each package for transport on a passenger aircraft. The mass quoted is the net mass unless otherwise indicated by a letter "G". Where a maximum net quantity appears beside a packing instruction prefixed by the letter "Y", this indicates it is the maximum net quantity permitted in a packaging containing limited quantities of dangerous goods. The maximum quantity per package may be further limited by the type of packaging used. The maximum net quantities indicated may be exceeded only as permitted in the Supplement to these Instructions in S-3;2 with the approval of the appropriate national authority of the State of Origin and the State of the Operator.

. . .

Column 13 "Cargo aircraft — Maximum net quantity per package" — this gives information similar to that in column 11, but for articles or substances which may be transported on a cargo aircraft only. The mass quoted is the net mass unless otherwise indicated by a letter "G". The maximum quantity per package may be further limited by the type of packaging used. The maximum net quantities indicated do not apply to transport in portable tanks, as permitted in the Supplement to these Instructions, Part S-4, Chapter 12, with the approval of the appropriate authority of the State of Origin and the State of the Operator. The maximum net quantities indicated may be exceeded only as permitted in the Supplement to these Instructions in S-3;2 with the approval of the appropriate national authority of the State of Origin and the State of the Operator.

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Table 3-1. Dangerous Goods List

									Passenger aircraft		*Cargo aircraft*	
Name	*UN No.*	*Class or division*	*Subsidiary risk*	*Labels*	*State variations*	*Special provisions*	*UN packing group*	*Excepted quantity*	*Packing instruction*	*Max. net quantity per package*	*Packing instruction*	*Max. net quantity per package*
1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
Charges, shaped without detonator	0059	1.1D				~~A109~~A2			FORBI	DDEN	FORBI	DDEN
Cord, detonating,flexible	0065	1.1D				~~A109~~A2			FORBI	DDEN	FORBI	DDEN
Fracturing devices, explosive, without detonator for oil wells	0099	1.1D				~~A109~~A2			FORBI	DDEN	FORBI	DDEN

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Chapter 3

SPECIAL PROVISIONS

. . .

Table 3-2. Special provisions

TIs	*UN*	
A1		This ~~commodity~~ article or substance may be transported on passenger aircraft, only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by ~~that~~ those authorit~~y~~ies. The conditions must include the quantity limitations and packing requirements and these must comply with S-3;1.2.2 of the Supplement. A copy of the document**s** of approval, showing the quantity limitations and packing requirements, must accompany the consignment. The ~~commodity~~ article or substance may be carried on cargo aircraft in accordance with columns 12 and 13 of Table 3-1. When States, other than the State of Origin and the State of the Operator, have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from these States, as appropriate.
A2		This ~~commodity~~ article or substance may be transported on ~~passenger aircraft and on~~ cargo aircraft, only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by ~~the~~ those authorit~~y~~ies. Where States, other than the State of Origin and the State of the Operator, have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from the States of transit, overflight and destination ~~and of the State of the Operator~~, as appropriate. In each case the conditions must include the quantity limitations and packing requirements and these must comply with S-3;1.2.3 of the Supplement. A copy of the document(s) of approval, showing the quantity limitations and the packing and labelling requirements, must accompany the consignment.

. . .

A62	(178)	This designation ~~must be used only~~ may only be used when no other appropriate designation exists in the list and then only with the approval of the appropriate authority of the State of Origin.

. . .

A78		Radioactive material with a subsidiary risk must: . . . Radioactive material with a subsidiary risk of Division 4.2 (Packing Group I) must be transported in Type B packages. Radioactive material with a subsidiary risk of Division 2.1 is forbidden from transport on passenger aircraft, and radioactive material with a subsidiary risk of Division 2.3 is forbidden from transport on passenger or cargo aircraft except with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the conditions established by ~~that authority~~ those authorities. A copy of the document of approval, showing the quantity limitations and the packaging requirements, must accompany the consignment.

. . .

A109		Not used.~~This commodity may be transported on cargo aircraft, only with the prior approval of the appropriate authority of the State of Origin under the written conditions established by that authority. The conditions must include the quantity limitations and packing requirements and these must comply with S-3;1.2.4 of the Supplement. A copy of the document of approval, showing the quantity limitations and packing requirements, must accompany the consignment.~~

TIs	*UN*	
		~~Where States, other than the State of Origin, have notified ICAO that they require prior approval of shipments made under this special provision, approval must also be obtained from these States, as appropriate.~~

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Part 4

PACKING INSTRUCTIONS

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INTRODUCTORY NOTES

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Note 6.— Portable tanks

With the approval of the appropriate authority of the State of Origin and the State of the Operator, certain dangerous goods may also be carried on cargo aircraft in portable tanks in accordance with the provisions of Part S-4, Chapter 12 of the Supplement.

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Chapter 2

GENERAL

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2.3 The packing instruction numbers are prominently displayed on the outer edge of each page for easy reference. Each instruction shows, where applicable, the acceptable single and combination packagings. For combination packagings, tables show the acceptable outer packagings and associated inner packagings with the maximum net quantity permitted in each inner packaging. The maximum quantity per inner packaging may be further limited by the maximum quantity per package specified in Table 3-1. Where provisions for particular articles or substances apply, tables show the inner packagings with associated quantity limitations and single packagings which are acceptable for the individual commodities (identified by their UN Number). The maximum net quantity per inner packaging may be exceeded only as permitted in the Supplement to these Instructions in S-4, with the approval of the State of Origin and the State of the Operator. If a commodity is identified in the table applicable to inner packagings of combination packagings but not in the table applicable to single packagings, it means that the particular commodity is not permitted in single packagings. Where appropriate, particular packing requirements are also indicated for each commodity; these requirements are detailed at the end of that packing instruction. Particular packing requirements apply to both inner packagings of combination packagings and single packagings as appropriate.

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2.9 UNPACKAGED ARTICLES OTHER THAN CLASS 1 ARTICLES

The appropriate authority of the State of Origin and the State of the Operator may approve the transport of large and robust articles which cannot be packaged in accordance with the requirements of 6;1 to 6;4, where they have to be transported empty, uncleaned and unpackaged, providing they comply with the requirements in Part S-4, Chapter 3 of the Supplement.

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Part 5

SHIPPER'S RESPONSIBILITIES

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Chapter 4

DOCUMENTATION

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4.1 DANGEROUS GOODS TRANSPORT INFORMATION

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4.1.5 Information required in addition to the dangerous goods description

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4.1.5.8 *Additional requirements*

4.1.5.8.1 The dangerous goods transport document must also contain:

a) the packing instruction applied and, when applicable, reference to Special Provision A1~~,~~ or A2 ~~or A109~~, except for radioactive material;

b) a statement indicating that the shipment is within the limitations prescribed for either passenger and cargo aircraft or cargo-only aircraft, as appropriate;

Note.— To qualify as acceptable for transport aboard passenger aircraft, passenger aircraft packing instruction number(s) must be used, and the package must not bear the "Cargo aircraft only" label. To qualify as acceptable for transport aboard cargo-only aircraft, cargo aircraft packing instruction number(s) must be used, and the package must bear the "Cargo aircraft only" label; or passenger aircraft instruction number(s) must be shown and no "Cargo aircraft only" label applied. However, where the packing instruction number(s) and the permitted quantity per package are identical for passenger and cargo aircraft, the "Cargo aircraft only" label should not be used.

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4.3 ADDITIONAL DOCUMENTATION FOR OTHER THAN RADIOACTIVE MATERIAL

4.3.1 When dangerous goods are shipped as authorized by Special Provision A1~~,~~ or A2 ~~or A109~~, they must be accompanied by a copy of the document(s) of approval, showing the quantity limitations, the packing requirements and, in the case of A2, the labelling requirements.

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Part 7

OPERATOR'S RESPONSIBILITIES

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Chapter 2

STORAGE AND LOADING

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2.1.2 Under the conditions specified in S-7;2.2 of the Supplement, the State of Origin and the State of the Operator may approve the transport of dangerous goods in main deck cargo compartments of passenger aircraft that do not meet the requirements in 2.1.1.

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APPENDIX C

PROPOSED AMENDMENTS TO PROVISIONS RELATED TO APPROVALS AND EXEMPTIONS IN THE SUPPLEMENT TO THE TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

Part S-1

GENERAL

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Chapter 1

SCOPE AND APPLICABILITY

Editorial Note.— Renumbering of paragraph 1.1 below is a consequence of an amendment proposed in the appendix to the Report on Agenda Item 3.

~~1.1~~1.2 GENERAL INFORMATION TO BE PROVIDED TO A STATE FOR THE PROCESSING OF EXEMPTIONS

1.2.1 Part 1;1.1.2 of the Technical Instructions provides for States to grant exemptions to enable the transport by air of dangerous goods which may not be permitted in normal circumstances or in conditions which are different to those prescribed in the Instructions. Such exemptions may only be granted in instances of extreme urgency, when other forms of transport are inappropriate or when full compliance with the Technical Instructions is contrary to the public interest. The following is offered as guidance to States to determine whether these criteria have been met:

a) *Extreme urgency*. In deciding whether the transport is urgent, States should consider why it is important for a consignment to reach its destination quickly or why it has been necessary to make an application at short notice. Dangerous goods may need to be transported because of;

1) humanitarian relief;

2) environmental relief;

3) pestilence;

4) national or international security;

5) saving of life (e.g. rescue);

6) limited availability at destination.

Applications based on commercial reasons only should not be viewed as urgent and carriage by other forms of transport should also be considered.

b) *When other forms of transport are inappropriate*. Whilst carriage by other forms of transport may be possible, States should evaluate a risk analysis which should include consideration of:

1) *Length of journey*. Transport by other forms may result in an unrealistic journey time and could affect the viability of the dangerous goods;

2) *Infrastructure*. The availability of other forms of transport may be limited;

3) *Security.* The comprehensive security provisions of the air mode may reduce the possibility of unlawful interference (theft, etc.);

4) *Routeing.* Transport by air may result in a reduced risk of exposure of the public to the dangerous goods in the event of an incident or accident. The risk of piracy may also be significantly reduced;

5) *Cost.* The cost of carriage by other forms of transport may be economically unreasonable. However, the decision to grant an exemption should not be based on cost alone.

c) *When full compliance with the Technical Instructions is contrary to the public interest, for example:*

1) medical applications;

2) new technologies;

3) enhancements in safety

1.2.2 When a State is approached for an exemption it is suggested that, if it is appropriate, at least the following information should be supplied before consideration is given to granting an exemption:

a) the reason why it is essential the article or substance must be carried by air;

b) a statement why the applicant believes the proposal (including any safety control measures specified by the applicant) will achieve a level of safety equivalent to that provided by these Instructions;

c) proposed proper shipping name, classification and UN number with full supporting technical data;

d) the proposed packaging;

e) quantity to be carried;

f) any special handling required and any special emergency response information;

g) name and address of ~~consignor~~ shipper and consignee; ~~and~~

h) the airports of departure, transit and destination and the proposed dates of transport ~~and routing.~~; and

i) details of the operator including aircraft type, flight numbers etc.

1.2.3 When granting an exemption, an overall level of safety in transport which is at least equivalent to the level of safety provided by the Technical Instructions must be achieved. In determining an equivalent level of safety the following should be considered:

a) A review of the applicable regulatory provisions. This includes an identification of the specific provisions which will not be met, thus requiring determination that an equivalent level of safety has been achieved;

b) A review of any potential increased risk to safety or property that may result from deviating from the provisions in question and identification of the measures considered necessary or appropriate to address that risk. This should include substantiation with applicable analysis or evaluation demonstrating that the proposed additional measures will achieve a level of safety that is at least equal to that required by the Technical Instructions;

c) A thorough review and risk assessment to identify and evaluate potential risks in transport. This may include a risk analysis addressing failure modes and effects, a systems safety evaluation, and an explanation of the measures imposed to ensure each risk factor has been evaluated to provide an appropriate level of safety;

d) When appropriate, risk mitigation factors and a safety analysis may be based on analogy to requirements in place for technologies posing similar risks in order to ensure safety and regulatory consistency.

1.~~2~~3 GENERAL RECOMMENDATIONS TO BE CONSIDERED WHEN ISSUING EXEMPTIONS

1.~~2~~3.1 When an exemption is to be issued by a State it is suggested that, if appropriate, the following items should be considered to be the minimum requirements to be applied in connection with that exemption:

a) notification should be provided to the authorities at the relevant airports within that State;

b) the packing method to be used should, where possible, be as shown in the supplementary dangerous goods list. The packaging to be used should provide a level of safety at least equivalent to that which is needed in order to meet the applicable requirements of Parts 4 and 6 of the Technical Instructions; and

c) copies of the relevant exemption documents should be attached to the dangerous goods transport document which accompanies the goods.

1.~~2~~3.2 When a State grants an exemption it should contain, as a minimum, the following:

a) the UN number, proper shipping name and the classification of the goods;

b) the packaging and quantity applicable;

c) the information listed in 1.1 f) to 1.1 h) above; and

d) the duration of the validity of the exemption, which normally should not exceed a period of two years from the date of issue.

A copy of the exemption must be provided to the operator concerned.

1.~~2~~3.3 The responsibility for obtaining the above exemption~~(s)~~ may rest with a State or with the operator or with the shipper, depending on States' national procedures. Generally, the applicant for an exemption should be the party for whom the responsibilities are most relevant e.g. when an exemption is granted for dangerous goods which are forbidden under normal circumstances, it may be most appropriate for the shipper to apply. However, the exemption must address all affected parties. Irrespective of who is responsible, the operator must be in possession of confirmation that all the required exemptions have been obtained prior to accepting the goods for shipment.

Note.— Usually an exemption should cover a single occasion, but it may be necessary to issue exemptions to cover multiple occasions and/or multiple shippers.

1.3.4 An exemption must not be granted for any dangerous goods indicated as forbidden under any circumstance, as described in 1.2.1. Where dangerous goods are forbidden on both passenger and cargo aircraft consideration should ordinarily only be given to carriage on cargo aircraft. Transport on a passenger aircraft should only be considered in exceptional circumstances.

1.3.5 Where an exemption or approval is required from more than one State, it is usually most appropriate for the State of Origin to grant the initial exemption because they may have greater awareness of the shipper and the terms and conditions under which the dangerous goods will be shipped. However there may be circumstances where another State concerned might be better placed to grant the initial exemption.

1.~~3~~4 REQUESTS FOR AMENDMENTS TO THE TECHNICAL INSTRUCTIONS

Upon receipt of a request for amendment to the Technical Instructions, a State should:

1) review the request for completeness (see information required in Part 1;1.5 of the Technical Instructions);

2) check the validity of the data presented in the request;

3) compare the data with other relevant data available or initiate the procurement of further data that may be necessary; and

4) if it is determined that the request is both sound and appropriate, present to ICAO a specific proposal for an amendment to the Technical Instructions.

Part S-3

DANGEROUS GOODS LIST AND LIMITED QUANTITIES EXCEPTIONS

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Chapter 1

GENERAL

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1.1 SUPPLEMENTARY DANGEROUS GOODS LIST

1.1.1 Certain dangerous goods, which are normally forbidden, may be specifically authorized for air transport by approval of the appropriate national authority; these are identified in Table 3-1 of the Technical Instructions by Special Provision A1~~,~~ or A2 ~~or A109~~ appearing in column 7. Such dangerous goods are also listed in Table S-3-1, together with additional information for use with appropriate national authority approvals.

1.1.2 Other dangerous goods shown as forbidden in columns 10 to 13 of Table 3-1, but without Special Provision A1~~,~~ or A2 ~~or A109~~, can only be transported under exemption as provided for in Part 1;1.1.2 of the Technical Instructions. Such dangerous goods are listed in Table S-3-1, together with any additional information that is available, to assist in the ~~issuing~~granting of an exemption. The absence of complete information in that Table, apart from the word “Forbidden” appearing in the same column(s) as in Table 3-1, does not preclude the ~~issue~~granting of an exemption by all the States concerned; in such case, the conditions of the exemption are to be developed by the appropriate national authority based on the principle that the level of safety in transport should be equivalent to the level of safety provided by the Technical Instructions. Where an entry in Table S-3-1 has a number in parenthesis after the word “Forbidden”, this refers to a Packing Instruction which contains the method of packing that should be specified when ~~issuing~~granting an exemption.

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1.2 QUANTITY LIMITATIONS AND PACKING REQUIREMENTS

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1.2.2 In the case of Special Provision A1, dangerous goods may be transported on passenger aircraft with the prior approval of the appropriate authority of the State of Origin and the State of the Operator provided that the quantity per package does not exceed the quantity shown in Table S-3-1 and the packing is in accordance with the packing instruction indicated by Table S-3-1. The detailed requirements of the packing instruction are given in Part S-4, unless they already appear in the Technical Instructions. A copy of the document~~s~~ of approval showing the quantity limitations and packing requirements must accompany the consignment. Approval is not required for transport on cargo aircraft in these cases.

1.2.3 In the case of Special Provision A2, dangerous goods may be transported on passenger and cargo aircraft with the prior approval of the appropriate authority of the State of Origin and the State of the Operator provided that the quantity per package does not exceed the quantity shown in Table S-3-1 and the packing is in accordance with the packing instruction indicated by Table S-3-1. The detailed requirements of the packing instruction are given in Part S-4, unless they already appear in the Technical Instructions. The consignment must be accompanied by a copy of the document~~s~~~~(s)~~ of approval showing the quantity limitations and packing and labelling requirements.

~~1.2.4 In the case of Special Provision 109, dangerous goods may be transported on cargo aircraft with the prior approval of the appropriate authority of the State of Origin provided that the quantity per package does not exceed the quantity shown in Table S-3-1 and the packing is in accordance with the packing instruction indicated by Table S-3-1. The detailed requirements of the packing instruction are given in Part S-4, unless they already appear in the Technical Instructions. The consignment must be accompanied by a copy of the document~~s~~(s) of approval showing the quantity limitations and packing and labelling requirements.~~

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Part S-4

PACKING INSTRUCTIONS

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Chapter 3

CLASS 1 — EXPLOSIVES

3.1 LARGE AND ROBUST ARTICLES

3.1.1 The appropriate authority of the State of Origin and the State of Operator may approve the transport of large and robust articles which cannot be packaged in accordance with the requirements of Part 6, Chapters 1 to 4 of the Technical Instructions where they have to be transported empty, uncleaned and unpackaged.

3.1.2 In doing so, the appropriate authority of the State of Origin and the State of Operator must take into account that:

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3.1.3 All other relevant provisions of the Instructions apply. A copy of the approvals must accompany the consignment.

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Chapter 12

PORTABLE TANKS

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12.1 GENERAL

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12.1.2 Portable tanks may be used for the transport of dangerous goods in accordance with the provisions of this Chapter only when the following conditions are met:

a) transport is on cargo aircraft only;

b) approval of the appropriate authority of the State of Origin and the State of the Operator is obtained;

c) the Packing Instruction for the substance indicated in column 12 of Table 3-1 of the Technical Instructions authorizes the substance to be transported in steel drums as single packagings; and

d) for liquid dangerous goods, the substance is authorized for transport in portable tanks by the International Maritime Organization (IMO), International Maritime Dangerous Goods (IMDG) Code.

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12.5 ADDITIONAL DOCUMENTATION

The requirements concerning the dangerous goods transport document in Part 5;4.1 of the Technical Instructions must be met. When dangerous goods are shipped in portable tanks under the approval of the appropriate authority of the State of Origin and the State of the Operator, the consignment must be accompanied by a copy of the documents of approval showing all relevant transport conditions.

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Part S-7

STATE'S RESPONSIBILITIES

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Chapter 2

STORAGE AND LOADING

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2.2 LOADING ON PASSENGER AIRCRAFT

2.2.1 Part 7;2.1 of the Technical Instructions provides that dangerous goods may only be carried in a main deck cargo compartment of a passenger aircraft that meet the certification requirements for a Class B or C cargo compartment. There may be occasions when there is a need to carry dangerous goods on passenger aircraft that do not have these cargo compartments, such as on those serving remote areas where there is no other transport available. In such circumstances, the State of Origin and the State of the Operator may approve the transport of dangerous goods in accordance with the following paragraphs.

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APPENDIX D

PROPOSED AMENDMENTS TO PROVISIONS RELATED TO LITHIUM BATTERIES IN THE TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

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Chapter 3

SPECIAL PROVISIONS

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Table 3-2. Special provisions

TIs	*UN*	
. . .		
A88		Prototype or low production (i.e., annual production runs consisting of not more than 100 lithium batteries or cells) lithium batteries ~~and~~ or cells ~~to be tested that are packed with not more than 24 cells or 12 batteries per packaging~~ that have not been tested to the requirements in subsection 38.3 of the UN Manual of Tests and Criteria may be transported aboard cargo aircraft if approved by the appropriate authority of the State of Origin and the following requirements are met: a) Except as provided in paragraph c), ~~the~~ cells ~~and~~ or batteries must be transported in an outer packaging that is a metal, plastic or plywood drum or a metal, plastic or wooden box and that meets the criteria for Packing Group I packagings; ~~and~~ b) Except as provided in paragraph c), each cell ~~and~~ or battery must be individually packed in an inner packaging inside an outer packaging and surrounded by cushioning material that is non-combustible, and non-conductive. Cells ~~and~~ or batteries must be protected against short circuiting ~~.~~ ; c) Lithium batteries with a mass of 12 kg or greater and having a strong, impact resistant outer casing, or assemblies of such batteries, may be packed in strong outer packagings or protective enclosures not subject to the requirements of Part 6 of these Instructions. The batteries or battery assemblies must be protected against short circuiting; and d) A copy of the document of approval showing the quantity limitations must accompany the consignment. Irrespective of the limit specified in column 13 of Table 3-1, the battery or battery assembly as prepared for transport may have a mass exceeding 35 kg G.
. . .		

TIs	*UN*	
A99		Irrespective of the ~~limit~~ quantity limits for cargo aircraft specified in column 13 of Table 3-1, and in Section I of Packing Instructions 965, 966, 967, 968, 969 and 970, a lithium battery or battery assembly (i.e. UN 3090 or UN 3480), including when packed with equipment or contained in equipment (i.e. UN 3091 or UN 3481) that meets the other requirements of Section I of the applicable packing instruction, ~~has successfully passed the tests specified in the UN *Manual of Tests and Criteria*, Part III, subsection 38.3, and that meets the requirements of Packing Instruction 965 for lithium ion batteries and Packing Instruction 968 for lithium metal batteries as prepared for transport~~ may have a mass exceeding 35 kg ~~G~~, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.

Editorial Note.— Special Provision A99 is applied to UN 3091 and UN 3481 and is reflected in Table 3-1 as shown in the attachments to the Report on Agenda Item 2.

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A181	When a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment, the package must be marked UN 3091 **Lithium metal batteries packed with equipment**, or UN 3481 **Lithium ion batteries packed with equipment** as appropriate. If a package contains both lithium ion batteries and lithium metal batteries, the package must be marked as required for both battery types. However, button cell batteries installed in equipment (including circuit boards) need not be considered.
A182	Equipment containing only lithium batteries must be classified as either UN 3091 or UN 3481.
A183	Waste batteries and batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

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Part 4

PACKING INSTRUCTIONS

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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Packing Instruction 950

Passenger and cargo aircraft for UN 3166 only
(See Packing Instruction 951 for flammable gas-powered vehicles and engines or
Packing Instruction 952 for battery-powered equipment and vehicles)

. . .

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;

2) if lithium batteries are installed, they must be of a type that has successfully passed the tests specified in the UN Manual of Tests and Criteria, Part III, subsection 38.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and

3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

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Packing Instruction 951

Cargo aircraft only for UN 3166 only
(See Packing Instruction 950 for flammable liquid-powered vehicles and engines or
Packing Instruction 952 for battery-powered equipment and vehicles)

. . .

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;

2) if lithium batteries are installed, they must be of a type that has successfully passed the tests specified in the UN Manual of Tests and Criteria, Part III, subsection 38.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and

3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

. . .

Packing Instruction 952

Passenger and cargo aircraft for UN 3171 only
(See Packing Instruction 950 for flammable liquid-powered vehicles and engines or
Packing Instruction 951 for flammable gas-powered vehicles and engines)

. . .

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;

2) if lithium batteries are installed in a vehicle, they must be of a type that has successfully passed the tests specified in the UN Manual of Tests and Criteria, Part III, subsection 38.3, unless otherwise approved by the appropriate authority of the State of Origin, must be securely fastened in the vehicle, machinery or equipment and must be protected in such a manner so as to prevent damage and short circuits; and

3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

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Packing Instruction 965

Passenger and cargo aircraft for UN 3480

This entry applies to lithium ion or lithium polymer batteries ~~in Class 9 (Section I) and lithium ion or lithium polymer batteries subject to specific requirements of these Instructions (Section II)~~.

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the

requirements of Section II of this packing instruction, subject to the paragraphs above, are not subject to other additional requirements of these Instructions.

SECTION I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1) be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; and

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

2) incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

Each battery containing cells or a series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

General requirements

Part 4;1 requirements must be met.

Contents	*Package quantity (Section I)*	
	Passenger	*Cargo*
Lithium ion cells and batteries	5 kg G	35 kg G

ADDITIONAL PACKING REQUIREMENTS

— Lithium ion cells and batteries must be protected against short circuits.
— ~~Packagings must meet the Packing Group II performance requirements.~~
— Lithium ion cells and batteries must be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.
— Lithium ion batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings ~~and~~ or protective enclosures not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastic (3H2)
Natural wood (4C1, 4C2)	Plastic (1H2)	Steel (3A2)
Plastic (4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

SECTION II

Lithium ion cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

~~Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~

Lithium ion cells and batteries may be offered for transport if they meet the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
   — the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009~~, which may be transported in accordance with the provisions of this section and without the marking until 31 December 2010~~;
3) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

General requirements

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1).

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Lithium ion cells and batteries	10 kg G	10 kg G

ADDITIONAL PACKING REQUIREMENTS

— Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.
— Cells and batteries must 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.
— Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
  — damage to cells or batteries contained therein;
  — shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  — release of contents.
— Each package must be labelled with a lithium battery handling label (Figure 5-31).
— Each consignment must be accompanied with a document ~~such as an air waybill~~ with an indication that:
  — the package contains lithium ion cells or batteries;
  — the package must be handled with care and that a flammability hazard exists if the package is damaged;
  — special procedures ~~should~~ must be followed in the event the package is damaged, to include inspection and repacking if necessary; ~~and~~
  — a telephone number for additional information~~.~~; and
  — the words “lithium ion batteries”, “not restricted” and “PI965” must be placed on the air waybill, when an air waybill is used.
— Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

OUTER PACKAGINGS

Boxes *Drums* *Jerricans*

Strong outer packagings

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

This entry applies to lithium ion or lithium polymer batteries packed with equipment ~~in Class 9 (Section I) and lithium ion or lithium polymer batteries packed with equipment subject to specific requirements of these Instructions (Section II)~~.

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to the paragraph above, are not subject to other additional requirements of these Instructions.

SECTION I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1) be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; and

   Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

2) incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

Each battery containing cells or a series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

General requirements

Part 4;1 requirements must be met.

Contents	*Package quantity (Section I)*	
	Passenger	*Cargo*
Quantity of lithium ion cells and batteries per ~~overpack~~ package, excluding equipment	5 kg	35 kg

ADDITIONAL PACKING REQUIREMENTS

— Lithium ion cells and batteries must be protected against short circuits.
— Lithium ion cells or batteries must:
  — be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  — be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a package that meets the Packing Group II performance requirements.
— ~~The equipment and the packages of lithium cells or batteries must be placed in an overpack. The overpack must bear applicable marks and labels as set out in Part 5;1 and 5;2.4.10.~~
— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
— For the purpose of this packing instruction, “equipment” means apparatus requiring the lithium ion batteries with which it is packed for its operation.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastic (3H2)
Natural wood (4C1, 4C2)	Plastic (1H2)	Steel (3A2)
Plastic (4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

SECTION II

Lithium ion cells and batteries ~~(including lithium polymer)~~ packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

~~Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~

Lithium ion cells and batteries may be offered for transport if they meet the following:

1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
   — the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009~~, which may be transported in accordance with the provisions of this section and without the marking until 31 December 2010~~;
3) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

General requirements

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1).

ADDITIONAL PACKING REQUIREMENTS

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery.
- Cells and batteries must 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 equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The maximum number of batteries in each package must be the minimum number required to power the equipment, plus two spares.
- Lithium ion cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong outer packaging.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
- Each package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document ~~such as an air waybill~~ with an indication that:
  - the package contains lithium ion cells or batteries;
  - the package must be handled with care and that a flammability hazard exists if the package is damaged;
  - special procedures ~~should~~ must be followed in the event the package is damaged, to include inspection and repacking if necessary; ~~and~~
  - a telephone number for additional information; and
  - the words “lithium ion batteries”, “not restricted” and “PI966” must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 967

Passenger and cargo aircraft for UN 3481 (contained in equipment) only

This entry applies to lithium ion or lithium polymer batteries contained in equipment ~~in Class 9 (Section I) and lithium ion or lithium polymer batteries contained in equipment subject to specific requirements of these Instructions (Section II)~~.

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to the paragraph above, are not subject to other additional requirements of these Instructions.

SECTION I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1) be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; and

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

2) incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

Each battery containing cells or a series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

General requirements

~~Part 4;1 requirements must be met.~~Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1)

Contents	*Net quantity per piece of equipment (Section I)*	
	Passenger	*Cargo*
Lithium ion batteries contained in equipment	5 kg	35 kg

ADDITIONAL PACKING REQUIREMENTS

~~— Outer packaging must be waterproof or made waterproof through the use of a liner, such as a plastic bag unless the equipment is made waterproof by nature of its construction.~~
— The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.
— The equipment must 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.
— Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

OUTER PACKAGINGS

Boxes *Drums* *Jerricans*

Strong outer packagings

SECTION II

Lithium ion cells and batteries~~ (including lithium polymer)~~ contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.
~~Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~

Lithium ion cells and batteries may be offered for transport if they meet the following:

1) for lithium ion cells ,the Watt-hour rating (see Glossary of Terms in Attachment 2) is not more than 20 Wh;
2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
   — the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009~~, which may be transported in accordance with the provisions of this section and without the marking until 31 December 2010~~;
3) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.

General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1).

ADDITIONAL PACKING REQUIREMENTS

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- ~~The equipment must be equipped with an effective means of preventing accidental activation.~~
- Cells and batteries must be protected so as to prevent short circuits.
- The equipment must 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.
- Each package containing more than four cells or more than two batteries installed in equipment must be labelled with a lithium battery handling label (Figure 5-31) (except button cell batteries installed in equipment (including circuit boards)).
- Each consignment with packages bearing the lithium battery handling label must be accompanied with a document ~~such as an air waybill~~ with an indication that:
  - the package contains lithium ion cells or batteries;
  - the package must be handled with care and that a flammability hazard exists if the package is damaged;
  - special procedures ~~should~~ must be followed in the event the package is damaged, to include inspection and repacking if necessary; ~~and~~
  - a telephone number for additional information~~.~~; and
  - the words "lithium ion batteries", "not restricted" and "PI967" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 968

Passenger and cargo aircraft for UN 3090

This entry applies to lithium metal or lithium alloy batteries in Class 9 (Section I) and lithium metal or lithium alloy batteries subject to specific requirements of these Instructions (Section II).

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to the paragraphs above, are not subject to other additional requirements of these Instructions.

SECTION I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1) be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; and

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

2) incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

Each battery containing cells or a series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

~~Cells, and batteries containing one or more cells, with a liquid cathode containing sulphur dioxide, sulphuryl chloride or thionyl chloride which have been discharged to the extent that the open circuit voltage is less than the lower of:~~

~~a) two volts; or~~
~~b) two thirds of the voltage of the undischarged cell;~~

~~are forbidden from transport.~~

General requirements

Part 4;1 requirements must be met.

Contents	*Package quantity (Section I)*	
	Passenger	*Cargo*
Lithium metal cells and batteries	2.5 kg G	35 kg G

ADDITIONAL PACKING REQUIREMENTS

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells and batteries must be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed ~~P~~packag~~ings~~e for the cells or batteries must meet the Packing Group II performance requirements.
- Lithium batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings and protective enclosures not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.
- For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
  - Cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging.
  - Cells and batteries must be surrounded by cushioning material that is non-combustible and non-conductive, and placed inside an outer packaging.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B) Fibreboard (4G) Natural wood (4C1, 4C2) Plastic (4H2) Plywood (4D) Reconstituted wood (4F) Steel (4A)	Aluminium (1B2) Fibre (1G) Plastic (1H2) Plywood (1D) Steel (1A2)	Aluminium (3B2) Plastic (3H2) Steel (3A2)

SECTION II

Lithium metal or lithium alloy cells and batteries offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

~~Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~

Lithium metal or lithium alloy cells and batteries may be offered for transport if they meet the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g;
3) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

General requirements

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1).

Contents	*Package quantity (Section II)*	
	Passenger	*Cargo*
Lithium metal cells and batteries	2.5 kg G	2.5 kg G

ADDITIONAL PACKING REQUIREMENTS

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging.
- Cells and batteries must 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.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
- Each package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document ~~such as an air waybill~~ with an indication that:
  - the package contains lithium metal cells or batteries;
  - the package must be handled with care and that a flammability hazard exists if the package is damaged;
  - special procedures ~~should~~ must be followed in the event the package is damaged, to include inspection and repacking if necessary; ~~and~~
  - a telephone number for additional information; and
  - the words “lithium metal batteries”, “not restricted” and “PI968” must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these

requirements commensurate with their responsibilities.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
	Strong outer packagings	

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

This entry applies to lithium metal or lithium alloy batteries packed with equipment ~~in Class 9 (Section I) and lithium metal or lithium alloy batteries packed with equipment subject to specific requirements of these Instructions (Section II)~~.

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to the paragraph above, are not subject to other additional requirements of these Instructions.

SECTION I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1) be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; and

   Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

2) incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

Each battery containing cells or a series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

~~Cells, and batteries containing one or more cells, with a liquid cathode containing sulphur dioxide, sulphuryl chloride or thionyl chloride which have been discharged to the extent that the open circuit voltage is less than the lower of:~~

~~a) two volts; or~~
~~b) two thirds of the voltage of the undischarged cell;~~

~~are forbidden from transport.~~

General requirements

Part 4;1 requirements must be met.

Contents	*Package quantity (Section I)*	
	Passenger	*Cargo*
Quantity of lithium metal cells and batteries per overpack, excluding equipment	5 kg	35 kg

ADDITIONAL PACKING REQUIREMENTS

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a package that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Each completed package containing lithium cells or batteries must be marked and labelled in accordance with the applicable requirements of 5;1, 5;2 and 5;3.
- ~~The equipment and the packages of lithium cells or batteries must be placed in an overpack. The overpack must bear applicable marks and labels as set out in 5;1 and 5;2.4.10.~~
- For the purpose of this packing instruction, “equipment” means apparatus requiring the lithium batteries with which it is packed for its operation.
- For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
  - Cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Aluminium (4B)	Aluminium (1B2)	Aluminium (3B2)
Fibreboard (4G)	Fibre (1G)	Plastic (3H2)
Natural wood (4C1, 4C2)	Plastic (1H2)	Steel (3A2)
Plastic (4H2)	Plywood (1D)	
Plywood (4D)	Steel (1A2)	
Reconstituted wood (4F)		
Steel (4A)		

SECTION II

Lithium metal cells and batteries packed with equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

~~Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~

Lithium metal cells and batteries may be offered for transport if they meet the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g;
3) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

General requirements

Batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1).

ADDITIONAL PACKING REQUIREMENTS

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery.
- Cells and batteries must 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 maximum number of batteries in each package must be the minimum number required to power the equipment, plus two spares.
- Lithium metal cells or batteries must:
  - be placed in inner packagings that completely enclose the cell or battery then placed in a strong outer packaging; or
  - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong outer packaging.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
  - damage to cells or batteries contained therein;
  - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
  - release of contents.
- Each package must be labelled with a lithium battery handling label (Figure 5-31).
- Each consignment must be accompanied with a document ~~such as an air waybill~~ with an indication that:
  - the package contains lithium metal cells or batteries;
  - the package must be handled with care and that a flammability hazard exists if the package is damaged;
  - special procedures ~~should~~ must be followed in the event the package is damaged, to include inspection and repacking if necessary; ~~and~~
  - a telephone number for additional information; and
  - the words “lithium metal batteries”, “not restricted” and “PI969” must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Packing Instruction 970

Passenger and cargo aircraft for UN 3091 (contained in equipment) only

This entry applies to lithium metal or lithium alloy batteries contained in equipment ~~in Class 9 (Section I) and lithium metal or lithium alloy batteries contained in equipment subject to specific requirements of these Instructions (Section II)~~.

Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to the paragraph above, are not subject to other additional requirements of these Instructions.

SECTION I

Section I requirements apply to each cell or battery type that has been determined to meet the criteria for assignment to Class 9.

Each cell or battery must:

1) be of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3; and

   Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

2) incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport and be equipped with an effective means of preventing external short circuits.

Each battery containing cells or a series of cells connected in parallel must be equipped with an effective means, as necessary, to prevent dangerous reverse current flow (e.g. diodes, fuses).

~~Cells, and batteries containing one or more cells, with a liquid cathode containing sulphur dioxide, sulphuryl chloride or thionyl chloride which have been discharged to the extent that the open circuit voltage is less than the lower of:~~

~~a) two volts; or~~
~~b) two thirds of the voltage of the undischarged cell;~~

~~are forbidden from transport.~~

General requirements

~~Part 4;1 requirements must be met.~~Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1)

Package contents	*Net quantity per piece of equipment (Section I)*	
	Passenger	*Cargo*
Lithium metal batteries	5 kg	35 kg

ADDITIONAL PACKING REQUIREMENTS

~~— Outer packaging must be waterproof or made waterproof through the use of a liner, such as a plastic bag unless the equipment is made waterproof by nature of its construction.~~
— The equipment must be secured against movement within the outer packaging and ~~be packed~~ must be equipped with an effective means of ~~so as to~~ preventing accidental ~~operation during air transport~~ activation.
— The equipment must 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.
— The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

OUTER PACKAGINGS

Boxes *Drums* *Jerricans*

Strong outer packaging

SECTION II

Lithium metal cells and batteries contained in equipment offered for transport are not subject to other additional requirements of these Instructions if they meet the requirements of this section.

~~Lithium batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).~~

Lithium metal cells and batteries may be offered for transport if they meet the following:

1) for a lithium metal cell, the lithium content is not more than 1 g;
2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.
3) each cell or battery is of the type proven to meet the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3.

Note.— Batteries are subject to these tests irrespective of whether the cells of which they are composed have been so tested.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.

General requirements

Equipment containing batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.9 (except 1.1.9.1).

ADDITIONAL PACKING REQUIREMENTS

— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
— ~~The equipment must be equipped with an effective means of preventing accidental activation.~~
— Cells and batteries must be protected so as to prevent short circuits.
— The equipment must 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.
— Each package containing more than four cells or more than two batteries installed in equipment must be labelled with a lithium battery handling label (Figure 5-31) (except button cell batteries installed in equipment (including circuit boards)).
— Each consignment with packages bearing the lithium battery handling label must be accompanied with a document ~~such as an air waybill~~ with an indication that:
  — the package contains lithium metal cells or batteries;
  — the package must be handled with care and that a flammability hazard exists if the package is damaged;
  — special procedures ~~should~~ must be followed in the event the package is damaged, to include inspection and repacking if necessary; ~~and~~
  — a telephone number for additional information; and
  — the words "lithium metal batteries", "not restricted" and "PI970" must be placed on the air waybill, when an air waybill is used.
— Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

OUTER PACKAGINGS

Boxes	*Drums*	*Jerricans*
Strong outer packagings		

Part 5

SHIPPER'S RESPONSIBILITIES

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Chapter 3

LABELLING

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3.5 LABEL SPECIFICATIONS

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3.5.2 Handling labels

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3.5.2.2 Lithium battery handling label

Packages containing lithium batteries packed according to Packing Instructions 965 to 970 that are not subject to other additional requirements of these Instructions must bear a "Lithium battery" handling label ~~(~~ shown in Figure 5-31~~)~~, as required by the applicable packing instruction. The label must be a minimum dimension of 120 mm × 110 mm except labels of 74 mm × 105 mm may be used on packages containing lithium batteries where the packages are of dimensions such that they can only bear smaller labels. The label must show "Lithium metal batteries" or "Lithium ion batteries", as applicable. Where the package contains both types of batteries, the label must show "Lithium metal and lithium ion batteries".

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Chapter 4

DOCUMENTATION

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4.1.5 Information required in addition to the dangerous goods description

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4.1.5.1 *Quantity of dangerous goods, number and type of packagings*

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UN packaging codes may only be used to supplement the description of the kind of package (e.g. one fibreboard box (4G)). Where the letter "G" follows the quantity in column 11 or 13 of Table 3-1 the gross mass of each package must be indicated, rather than the net quantity; and:

. . .

e) for items where "No Limit" or a packing instruction number is shown in columns ~~11~~ 10 ~~or~~ to 13 of Table 3-1, the quantity must be~~:~~

1) ~~the net mass or volume~~ for substances the net mass or volume (e.g. UN 2969, UN 3291)~~.~~;

2) for UN 3091 and UN 3481 when packed with equipment in accordance with Packing Instructions 969 and 966 respectively, the net quantity of battery(ies) per package; and

3) ~~F~~for other articles the gross mass, followed by the letter G (e.g. UN 2794, UN 2800, UN 2990, UN 3166)~~ the quantity must be the gross mass, followed by the letter G~~.

Part 7

OPERATOR'S RESPONSIBILITIES

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Chapter 4

PROVISION OF INFORMATION

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4.7 CARGO ACCEPTANCE AREAS — PROVISION OF INFORMATION

An operator or the operator's handling agent must ensure that notices giving information about the transport of dangerous goods~~,~~ are sufficient in number ~~and~~, prominently displayed~~,~~ and ~~are~~ provided at a visible location(s) at the cargo acceptance points ~~for cargo~~ to alert shippers/agents about any dangerous goods that may be contained in their cargo consignment(s). These notices must include visual examples of dangerous goods, including batteries.

Note.— Existing notices which do not include visual examples of dangerous goods, including batteries, may continue to be used until 31 December 2011.

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Part 8

PROVISIONS CONCERNING PASSENGERS AND CREW

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Chapter 1

PROVISIONS FOR DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

. . .

Medical necessities

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e) with the approval of the operator(s), battery-powered wheelchairs or other similar ~~battery-powered~~ mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), with non-spillable batteries ~~(see Packing Instruction 806 and Special Provision A67)~~, which comply with Special Provision A67 or the vibration and pressure differential tests of Packing Instruction 872, as checked baggage provided the battery terminals are protected from short circuits (e.g. by being enclosed within a battery container) and the battery is securely attached to the wheelchair or mobility aid. The operator(s) must ensure that wheelchairs or other battery powered mobility aids are carried in such a manner so as to prevent unintentional activation and that they are protected from being damaged by the movement of baggage, mail, stores or other cargo.

It is recommended that passengers make advance arrangements with each operator;

f) with the approval of the operator(s), battery-powered wheelchairs or other ~~battery-powered~~ similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), with spillable batteries as checked baggage, provided that the wheelchair or mobility aid can be loaded, stowed, secured and unloaded always in an upright position and that ~~the battery is disconnected,~~ the battery terminals are protected from short circuits (e.g. by being enclosed within a battery container) and the battery is securely attached to the wheelchair or mobility aid. The operator(s) must ensure that wheelchairs or other battery powered mobility aids are carried in such a manner so as to prevent unintentional activation and that they are protected from being damaged by the movement of baggage, mail, stores or other cargo. If the wheelchair or mobility aid cannot be loaded, stowed, secured and unloaded always in an upright position, the battery must be removed and the wheelchair or mobility aid may then be carried as checked baggage without restriction. The removed battery must be carried in strong, rigid packagings as follows:

1) these packagings must be leaktight, impervious to battery fluid and be protected against upset by securing them to pallets or by securing them in cargo compartments using appropriate means of securement (other than by bracing with freight or baggage) such as by use of restraining straps, brackets or holders;

2) batteries must be protected against short circuits, secured upright in these packagings and surrounded by compatible absorbent material sufficient to absorb their total liquid contents; and

3) these packagings must be marked “Battery, wet, with wheelchair” or “Battery, wet, with mobility aid” and be labelled with a “Corrosive” label (Figure 5-22) and with a package orientation label (Figure 5-26).

The pilot-in-command must be informed of the location of a wheelchair or mobility aid with an installed battery or the location of a packed battery.

It is recommended that passengers make advance arrangements with each operator; also unless batteries are non-spillable they should be fitted, where feasible, with spill-resistant vent caps;

g) with the approval of the operator(s), lithium-ion battery powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), subject to the following conditions:

1) the batteries must be of a type which meets the requirements of each test in the UN *Manual of Tests and Criteria*, Part III, section 38.3;

2) battery terminals must be protected from short circuits (e.g. by being enclosed within a battery container) and securely attached to the mobility aid;

3) the operator(s) must ensure that such mobility aids are carried in a manner so as to prevent unintentional activation and that they are protected from being damaged by the movement of baggage, mail, stores or other cargo; and

4) the pilot-in-command must be informed of the location of the mobility aid.

It is recommended that passengers make advance arrangements with each operator.

h) with the approval of the operator(s), portable medical electronic devices (Automated External Defibrilators (AED), Nebulizer, Continuous Positive Airway Pressure (CPAP), etc.) containing lithium metal or lithium ion cells or batteries carried by passengers for medical use. No more than two spare batteries may be carried. Spare batteries must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch) and carried in carry-on baggage only. Each installed or spare battery must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, section 38.3;

In addition, each installed or spare battery must not exceed the following:

— for lithium metal batteries, a lithium content of not more than 8 grams; or
— for lithium ion batteries, a watt-hour rating of not more than 160 Wh.

Renumber subsequent paragraphs accordingly

Consumer articles

. . .

~~g~~s) ~~consumer~~ portable electronic devices (watches, calculating machines, cameras, cellular phones, laptop computers, camcorders, etc.) containing lithium or lithium ion cells or batteries when carried by passengers or crew for personal use, which should be carried as carry-on baggage. Spare batteries must be individually protected so as to prevent

short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch) and carried in carry-on baggage only. In addition, each installed or spare battery must not exceed the following:

— for lithium metal ~~or lithium alloy~~ batteries, a lithium content of not more than 2 grams; or

— for lithium ion batteries, a watt-hour rating of not more than 100 Wh.

With the approval of the operator, lithium ion batteries exceeding a watt-hour rating of 100 Wh but not exceeding 160 Wh may be carried as spare batteries in carry-on baggage or in equipment in either checked or carry-on baggage. No more than two individually protected spare batteries per person may be carried.

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APPENDIX E

PROPOSED AMENDMENTS TO PROVISIONS RELATED TO THE REFORMATTED PACKING INSTRUCTIONS IN THE *TECHNICAL INSTRUCTIONS FOR THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR*

Part 6

PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

Chapter 1

APPLICABILITY, NOMENCLATURE AND CODES

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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.~~

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Table 6-3. Index of inner packagings

Code	*Kind*	*Paragraph*
~~IP.1~~	~~Earthenware, g~~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 p~~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~~9
~~IP.10~~	~~Bags, paper with plastic/aluminium~~	~~3.2.11~~

. . .

Chapter 3

REQUIREMENTS FOR PACKAGINGS

3.1 REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

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

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.~~

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Agenda Item 6: Other business

6.1 LAYOUT OF THE TECHNICAL INSTRUCTIONS (DGP/22-WP/34) AND RECOMMENDATION TO ENHANCING THE USER-FRIENDLINESS OF THE TECHNICAL INSTRUCTIONS (DGP/22-WP/65)

6.1.1 A proposal was made at DGP/21 to amend the paragraph numbering system in the Technical Instructions to include the part number. It was explained that due to the reorganization of the ICAO Secretariat which would likely result in reduced staff in the language sections, such a proposal could not even be considered at that time. A new proposal was presented at DGP/22 along with a second, similar proposal to enhance the user-friendliness of the Instructions.

6.1.2 Comments from members indicated that the part system which currently exists should remain. It was suggested the perception of user friendliness was different depending on who the audience is and that regulators generally prefer part numbers. Renumbering would be an enormous task which would affect not only the Instructions but also other regulatory and legal documents world-wide which reference the Instructions. In addition, numbering paragraphs consecutively would result in extremely long reference numbers making citing of them cumbersome. This system had been in place since the first edition of the Instructions; changing it without significant benefits would not be warranted.

6.2 MAKING THE TECHNICAL INSTRUCTIONS FREELY DOWNLOADABLE FROM THE INTERNET (DGP/22-WP/35)

6.2.1 Discussions to make the Technical Instructions available for download from the Internet free of charge had been the subject of discussion during working group meetings; a new proposal was presented to the DGP. The proposal was strongly supported by the panel on the basis that this would only enhance safety and facilitate a wider dissemination of the requirements contained in the Instructions. Although there was support from the Secretariat for this proposal, it was explained that the threat of a potential loss in revenue from the sale of the Instructions and the affect this would have on other initiatives currently funded by this revenue might prevent the proposal from being adopted. It was reported that sales of other dangerous goods regulations had in fact increased after they were made freely available on the Internet. It was agreed that figures confirming this statement should be supplied to the Secretary as a means to justifying the proposal within the Secretariat.

6.3 GUIDANCE MATERIAL FOR FUEL CELLS (DGP/22-WP/52)

6.3.1 Guidance material on fuel cells was developed with the intent of helping passengers, crew and the general public better understand and comply with provisions concerning fuel cells. It was proposed that the material be made available on the ICAO public website. There was full support for this proposal; it was agreed that the material would be updated when the 2011-2012 Edition of the Technical Instructions come into effect.

6.4 PERFORMANCE STANDARDS FOR STATE EMPLOYEES (DGP/22-WP/77)

6.4.1 Revised terms of reference of the Ad Hoc Working Group On Training were presented to the panel. It was proposed that the focus of working group be on the development of performance standards and competency-based training for State employees involved in the administration of the Technical Instructions.

6.4.2 There was concern that some of the programme activities required of a State to meet their obligations listed in the working paper might not be related to Annex 18. It was suggested the working group be cognizant of what is Annex 18 related and what is not. It was noted that the list was draft and that it could be revised once the work of the group began. It was stressed that performance standards as they relate to training should be addressed and not the level of performance on the job; job training was State specific and/or agency specific and was not within the scope of the panel.

6.4.3 There was much support for the establishment of this ad hoc working group and its terms of reference, and the work involved in developing these terms was noted with appreciation. It was agreed work would begin through correspondence.

6.5 COOPERATION BETWEEN THE UNITED NATIONS AND NATO (DGP/22-WP/92)

6.5.1 A presentation was given by the North Atlantic Treaty Organization (NATO). The presentation outlined common challenges NATO and the United Nations face in general and, more specifically, addressed challenges faced in relation to the safe transport of dangerous goods by air. The goal of the presentation was to seek the mutual cooperation of the DGP to address these challenges.

6.5.2 The panel was advised of a Memorandum issued by the Secretary Generals of NATO and the United Nations (Joint Declaration on UN/NATO Secretariat Cooperation, 23 September 2008) which emphasized the need for expanded consultation and cooperation between NATO and the UN and allowed for the development of further cooperation in a practical fashion on issues of common interest such as communication, information-sharing, capacity-building, training, lessons learned, and operational coordination and support.

6.5.3 NATO’s increased reliance on commercial air carriers had made the safe transport of dangerous goods by air, particularly those of Class 1, an issue of concern. Differences between international and national dangerous goods regulations and the challenges these differences present were also an area of concern. It was suggested that as the largest multinational defence and security organization in the world, NATO could provide a worthwhile contribution in future discussions on carriage of dangerous goods by helicopters. As a large portion of the ammunition and explosives in the world are produced for use by military forces, NATO’s expertise in the safe transport of Class 1 goods could also be of benefit to the panel.

6.5.4 A number of comments from the panel were in favour of establishing a cooperative relationship with NATO as a vehicle for exchange of information and expertise. Input from NATO on helicopters and guidance on providing exemptions for dangerous goods forbidden for transport by air would be welcome. It was explained that although there was support from the panel for future cooperative relations with NATO, a decision to establish this relationship was beyond the purview of the panel and would be left for consideration by the Air Navigation Commission.

6.6 THE UNITED ARAB EMIRATES' DIRECTOR GENERAL OF CIVIL AVIATION'S ADDRESS TO THE PANEL

6.6.1 The panel was honoured with an invitation by Mr. Saif Mohammed Al Suwaidi, Director General of Civil Aviation, United Arab Emirates to hold the DGP Working Group of the Whole Meeting in the United Arab Emirates (UAE) in November 2010. In addition to hosting this meeting, Mr. Saif Mohammed Al Suwaidi offered to host any emergency meetings, if and when required, to address urgent safety issues related to dangerous goods. He reported unprecedented growth in the aviation sector within the UAE and recognized the need for improving awareness in the field of dangerous goods. Holding a DGP meeting in his region would help achieve this. Before leaving, Mr. Saif Mohammed Al Suwaidi presented the Secretary and each member of the DGP with a memento from the UAE.

— END —