DGP/20-WP/93
19/12/05

DANGEROUS GOODS PANEL (DGP)

REPORT OF THE TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

GENERAL

The attached constitutes the general part of the report and should be inserted at the appropriate place in the yellow folder.

(11 pages)

REPORT OF THE TWENTIETH MEETING OF THE DANGEROUS GOODS PANEL (DGP) (2005)

LETTER OF TRANSMITTAL

To: President, Air Navigation Commission

From: Chairman, Dangerous Goods Panel (DGP) (2005)

I have the honour to submit the report of the twentieth meeting of the Dangerous Goods Panel (DGP) which was held in Montréal, from 24 October to 4 November 2005

J. Code
Chairman

Montréal, 4 November 2005

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REPORT OF THE MEETING

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 2007-2008 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 2007-2008 Edition

Agenda Item 4: Amendments to Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods (Doc 9481)

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

5.1: Principles governing the transport of dangerous goods on cargo only aircraft

5.2: Reformatting of the packing instructions

5.3: Review of provisions for dangerous goods carried by passengers and crew

LIST OF RECOMMENDATIONS*

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* 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)

REPORT OF THE TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

HISTORY OF THE MEETING

1. DURATION

1.1 The twentieth meeting of the Dangerous Goods Panel (DGP/20) was opened by Mr. R. Graff, President of the ANC of the Air Navigation Commission in Montréal, at 1000 hours on 24 October 2005. The meeting ended on 4 November 2005.

2. ATTENDANCE

2.1 The meeting was attended by members and observers nominated by sixteen Contracting States and nine international organizations, as well as by seventy-seven advisers and others as shown in the list below:

Members	Advisers	Nominated By
P. Steele	L. Willoughby	Australia
K. Vermeersch		Belgium
P.C. Guerreiro Lima	T. Vieira	Brazil
	H. Jawerbaum	
J. Code	D. Sylvestre	Canada
	D. Evans	
	A. Stukas	
	R. Garg	
J. Le Tonqueze	P. Tatin	France
H. Brockhaus	C. Weber	Germany
	R. Auschra	
	T. Seemann	
	P. Blümel	
	M. Philippi	
	V. Thurm	

Members	Advisers	Nominated By
H. Okayama	Y. Watanabe	Japan
	M. Satoh	
	N. Sawatari	
	M. Miyahara	
	H. Ishida	
	H. Obuse	
	F. Ueno	
D.E. Raadgers	S. Oosterhoff	Netherlands
	F. Bouman	
	H. Augustin	
	T. Woeltjes	
M.W. Evans		New Zealand
Y.A. Mikhin	D.V. Kourdchenko	Russian Federation
	U.A. Malyshev	
	V. Anisimov	
	V. Korovkin	
	E. Varenova	
S.O. Sanchez Serrano		Spain
O. Al Ameri	H. Al Muhairi	United Arab Emirates
G. Leach	J. Hart	United Kingdom
	R. Wells	
	R. Castle	
R.A. Richard	J. McLaughlin	United States
	J. Gale	
	C. Ke	
J. Abouchaar	P. Oppenheimer	IATA
	D. Brennan	
	R. Liao	
	R. Jessop	
	T. Gazetas	
W. Schuurman	Mark Rogers	IFALPA

Members	Advisers	Nominated By
	Dick Gierlings	
	Martin Gessl	
Advisers		
M.E. Wangler		IAEA
E. Altemos	D. Warden	DGAC
	R. Klein	
	S. Burkhart	
	A. Curello	
	D. Reichert	
	N. McCulloch	
	J. Paterson	
E. Sigrist		CEFIC
Observers		
Jiang Rui		China
Yan Shichang		
Yang Yisheng		
Chim Ho Bun, E.		
L. Bali		South Africa
A. McGinley		ACI
A. McCulloch		GEA
E. Thelisson		WNTI
R. Wichert		USFCC
Others		
F. Wybenga		
R. Sievers		
G. McLean		
H. Deo		
A. Ludwiczewski		
D. Weil		
J. Servaites		

The meeting was also attended by:

A. de la Vega	Alternate Representative of Chile on the Council of ICAO
A. Martono	Representative of Indonesia to ICAO
C. Aygün	Adviser to the Representative of Turkey to ICAO
H. Shahbazilar	Representative of Iran to ICAO
B. Thébault	Alternate Representative of France on the Council of ICAO
L. Vonlanthen	Alternate Representative of Austria on the Council of ICAO

3. OFFICERS AND SECRETARIAT

3.1 Mrs. J. Code was elected Chairman of the meeting. Mr. G. Leach and Mr. R. Richard were elected co-Vice Chairmen.

3.2 The Secretary of the meeting was Dr. Katherine Rooney, Technical Officer of the Flight Safety Section, who was assisted by Mr. L. Mortimer.

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 22 February 2005.

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 2007-2008 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 2007-2008 Edition

Agenda Item 4: Amendments to *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods (*Doc 9481)

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

5.1: Principles governing the transport of dangerous goods on cargo only aircraft
5.2: Reformatting of the packing instructions
5.3: Review of provisions for dangerous goods carried by passengers and crew

5. WORKING ARRANGEMENTS

5.1 The panel met as a single body, with ad hoc working 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 twentieth meeting of the Dangerous Good Panel.

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

Subsequent to the nineteenth meeting of the panel held in October 2003, the Commission considered your report and recommended to the Council the acceptance of all your recommendations. The Council adopted Amendment 8 to Annex 18 on 16 February 2005; the amendment became effective on 11 July 2005 and will become applicable on 24 November 2005. In addition the Council approved the amendments for the 2005-2006 Edition of the Technical Instructions to be applicable from 1 January 2005, as well as Addenda Nos. 1 and 2 on 18 February 2005 and 16 June 2005, respectively. I would, however, like to draw your attention to the concern expressed by the Commission at the issuance of a second addendum to the Instructions. We would have preferred to see the changes incorporated through the normal process but we accepted the arguments put forward to us by your Secretary. On behalf of the Commission, I ask you all to ensure that coordination between State authorities and medical experts be undertaken when considering any future amendments to the provisions for infectious substances.

One of your recommendations at DGP/19 concerned the inclusion of Annex 18 to be audited under the ICAO Safety Oversight Audit Programme. I am pleased to inform you that, as part of the comprehensive systems approach for the conduct of safety oversight audits, questions pertaining to Annex 18 and the Technical Instructions are now being asked of States. The new approach began in April of this year when Canada was the first State to be audited. Over the next five years, ICAO plans to audit all Contracting States. I am sure you will all be interested in the results obtained, as well as actively participate when it is the turn of your State to be audited.

Since the nineteenth meeting, there have been a number of changes in membership. Messrs. Busacker, Hinoul, Nakagawa and Ventresca have left the panel, and the Commission is grateful for the contribution they made. In their places, you have been joined by Mr. Brockhaus nominated by Germany, Mrs. Vermeersch nominated by Belgium and Mr. Okayama nominated by Japan. We are awaiting the nomination of a member by Italy.

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. Your contributions do not in any way commit your States or Organizations to those views. 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 and CNS/ATM systems, 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 2007-2008 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. We look forward to hearing the outcome of your discussions.

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. We will anyway meet again towards the end of your meeting for an informal debriefing on your achievements. I understand that will take place on the afternoon of the last Thursday and the Commissioners and myself look forward to listening to your chairman on that occasion.

It remains for me to declare open, then, the Twentieth 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 Montreal.

7. STATEMENTS BY MEMBERS

7.1 A member wished to express his regret that ICAO had been unable to provide the narrative texts of working papers in the languages of the meeting, as had always been its custom hitherto. This had made it difficult at times for members who need these languages to take a full part in the proceedings of the meeting.

7.2 A member drew attention to the poor quality of the binding of the Technical Instructions. He said that his copy of the document had often fallen apart before the provisions actually came into force. Other members echoed this complaint and requested ICAO to take steps to improve the document,

bearing in mind that it was in daily use by users of the Technical Instructions, such as shippers and carriers.

7.3 Mr. J. Abouchaar and Capt. W. Schuurman announced that they would both be leaving the DGP after this meeting. They thanked the other panel members for the friendly and cooperative spirit in which the panel's work was conducted. They both wished to reiterate that the focus of the organizations nominating them had always been the continuing safety of aviation.

8. ACCESS TO THE DGP CLOSED WEBSITE

8.1 An adviser to the panel raised the question of access to the DGP closed website (to review working papers, etc.) for non-members of the DGP who nevertheless had a legitimate interest in these documents. It was reported that the Secretary was in the process of making suitable arrangements

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DGP/20-WP/93
19/12/05

DANGEROUS GOODS PANEL (DGP)

REPORT OF THE TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

AGENDA ITEM 1

The attached constitutes the report on Agenda Item 1 and should be inserted at the appropriate place in the yellow folder.

(4 pages)

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

1.1 ANOMALIES IN ANNEX 18 (DGP/20-WP/15)

1.1.1 A member drew attention to what he perceived to be certain anomalies in the text of Annex 18. The first concerned paragraph 4.3 of the Annex which establishes that forbidden dangerous goods must not be carried on an aircraft. He considered that it would be more appropriate to say that such goods should not be offered for carriage. He subsequently withdrew this proposal, but the matter nevertheless raised some discussion.

1.1.2 One view was that an operator might legitimately not be aware that the dangerous goods in question were forbidden (e.g. if they had been wrongly declared). Other members thought that authorities were well aware of such situations and would not pursue an operator who could reasonably show that he was unaware of the dangerous goods in question.

1.1.3 The second concern was with paragraph 8.9 which specifies how dangerous goods labelled as "Cargo Aircraft Only" should be loaded, but does not state that they may not be loaded on passenger aircraft.

1.1.4 Other members did not consider this to be a problem since the expression "Cargo Aircraft Only" was considered to be adequately clear in relation to passenger aircraft.

1.2 FLIGHT SAFETY MANAGEMENT SYSTEMS (DGP/20-WP/79)

1.2.1 The Secretary drew the meeting's attention to amendments currently being proposed to other ICAO Annexes introducing the need to establish flight safety management systems. It was proposed that such systems should also be considered in the transport of dangerous goods by air and that Annex 18 should also be amended in due course. The meeting agreed that this subject should be examined as a future non-recurrent work programme item.

1.3 ANNEX 18, CHAPTER 12 — DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING (DGP-WG/05-WP/26)

1.3.1 It was noted that although there are requirements in the Technical Instructions to report dangerous goods accidents, incidents, undeclared or misdeclared dangerous goods, there is no corresponding requirement in Annex 18 for States to establish procedures for investigating and compiling information concerning undeclared and misdeclared dangerous goods in cargo. It was suggested this was a serious omission in the Annex and a proposal was made to rectify the situation. It was also proposed to make a similar requirement for forbidden dangerous goods found in baggage.

1.3.2 It was recognized that for many States, the number of investigations could be very large, but it was noted that the procedure might simply consist of reporting a discrepancy by telephone. With

regard to the discovery of forbidden dangerous goods in passenger baggage, it was suggested that a compilation of information would be sufficient. The proposals were modified to refer to cargo only and were then agreed and the amendment is shown in the appendix to the report on this agenda item.

1.3.3 The meeting noted that, because of the nature of this amendment, it could not be considered as urgent. It could therefore be processed in accordance with the normal amendment schedule.

1.3.4 In light of the foregoing, the meeting developed the following recommendation:

RSPP

Recommendation 1/1 — Amendment to Annex 18

That Annex 18 — *The Safe Transport of Dangerous Goods by Air* be amended as shown in the appendix to this part of the report.

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APPENDIX

PROPOSED AMENDMENT TO ANNEX 18

ANNEX 18

THE SAFE TRANSPORT OF DANGEROUS GOODS BY AIR

. . .

CHAPTER 12. DANGEROUS GOODS ACCIDENT AND INCIDENT REPORTING

12.1 With the aim of preventing the recurrence of dangerous goods accidents and incidents, each Contracting State shall establish procedures for investigating and compiling information concerning such accidents and incidents which occur in its territory and which involve the transport of dangerous goods originating in or destined for another State. Reports on such accidents and incidents shall be made in accordance with the detailed provisions of the Technical Instructions.

12.2 **Recommendation.—** *With the aim of preventing the recurrence of dangerous goods accidents and incidents, each Contracting State should establish procedures for investigating and compiling information concerning such accidents and incidents which occur in its territory other than those described in 12.1. Reports on such accidents and incidents should be made in accordance with the detailed provisions of the Technical Instructions.*

12.3 With the aim of preventing the recurrence of instances of undeclared or misdeclared dangerous goods in cargo, each Contracting State shall establish procedures for investigating and compiling information concerning such occurrences which occur in its territory and which involve the transport of dangerous goods originating in or destined for another State. Reports on such instances shall be made in accordance with the detailed provisions of the Technical Instructions.

12.4 **Recommendation.—** *With the aim of preventing the recurrence of instances of undeclared or misdeclared dangerous goods in cargo, each Contracting State should establish procedures for investigating and compiling information concerning such occurrences which occur in its territory other than those described in 12.3. Reports on such instances should be made in accordance with the detailed provisions of the Technical Instructions.*

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DGP/20-WP/93
19/12/05

DANGEROUS GOODS PANEL (DGP)

TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

AGENDA ITEM 2

The attached constitutes the report on Agenda Item 2 and should be inserted at the appropriate place in the yellow report folder.

(257 pages)

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 2007-2008 Edition

2.1 AMENDMENTS TO THE TECHNICAL INSTRUCTIONS TO ALIGN WITH THE UN RECOMMENDATIONS (DGP/20-WP/4, 5, 6, 7, 8, 9, 10, 11 and 12)

2.1.1 The meeting reviewed amendments to the Technical Instructions to reflect the decisions taken by the UN Sub-Committee of Experts on the Transport of Dangerous Goods (UNSCETDG) at the twenty-sixth session (Geneva, December 2004). It was noted that these changes had already been reviewed and modified at the meeting of the DGP Working Group of the Whole (Montreal, April, 2005). Further discussions on amendments to the individual parts of the Technical Instructions were as indicated in the following paragraphs.

2.1.2 Part 1 — General (DGP/20-WP/4)

2.1.2.1 The Secretary informed the meeting that the ICAO Legal Bureau had confirmed that "issued" was the appropriate word to use in paragraph 1.1.1 to describe ICAO's publication and distribution of the Technical Instructions.

2.1.2.2 It was agreed that it was appropriate to include a reference to the United Nations Economic Commission of Europe (UNECE) in paragraph 3.1 (Definitions). A suggestion to include a reference to the Compressed Gas Association was not agreed since there is no reference to this body in the text.

2.1.2.3 A member questioned whether it was appropriate to include the proposed new paragraph 1.4.2.4 in the Technical Instructions. He considered that the subject of training relating to a radiation protection programme was a general industrial safety matter and not specific to air transport or the transport of radioactive materials in general. The representative of the International Atomic Energy Agency (IAEA) informed the meeting that the text had been adopted by the UNSCETDG from IAEA regulations. He noted that IAEA was responsible for all aspects of radioactive materials, including transport thereof, and agreed that radiation protection programmes were more general in nature than transport aspects alone. In his view it would be for ICAO to decide whether the matter was appropriate for inclusion in the Technical Instructions. It was agreed that IAEA would raise the general issue of the appropriateness of the text for all transport modes with the UNSCETDG, but for harmonization reasons, ICAO would include it in the Technical Instructions for the time being.

2.1.2.4 The proposal to delete 1.4.2.5 a), in alignment with the UNSCETDG decision was questioned. Although the text indicated the conditions in which the monitoring of individuals involved in transport need not be conducted (since this should be evident from the definition of individuals who needed to be monitored and was not therefore strictly essential), it was considered that it would be a useful clarification to retain the text. This was especially considered to be the case in light of current difficulties being faced in the transport of radioactive materials. A possible solution to the problem was a suggestion to retain the text, but in the form of a note. There was general agreement with this proposal.

The Secretary was also requested to advise the UNSCETDG of this action and to suggest that that body might wish to take the same action.

2.1.2.5 The use of the words “terrorist incident” in paragraph 5.3.1 was questioned and it was suggested that “terrorist act” might be more appropriate. However, it was pointed out that the UNSCETDG used the word “incident” and it was agreed that it should therefore be retained in the Technical Instructions.

2.1.2.6 The need for the Note following 5.3.1 was questioned since it appeared to be redundant. It was explained that it was intended to remind States when issuing an exemption for any reason whatsoever that security aspects needed to be taken into account. It was agreed that this was not entirely clear from the text and it was agreed to clarify the text accordingly.

2.1.3 **Part 2 — Classification of Dangerous Goods (DGP/20-WP/5)**

2.1.3.1 It was agreed that the new paragraph 2.2.1 of the Introductory Chapter would be better added to the existing 2.3.

2.1.3.2 The addition of a reference to UN Recommendation paragraph 2.1.3.5 in the Note preceding paragraph 1.5.1.1 of the Technical Instructions was questioned. It was suggested that the subject matter — the classification of fireworks — was too important for a cross reference in this way and warranted more specific reference in the Technical Instructions. A new paragraph 1.5.1.2 was consequently agreed which specifically mentions the requirement to classify fireworks in accordance with paragraph 2.1.3.5 of the UN Regulations. It was agreed not to make any reference to the default classification table, since it was not mandatory and some States already used a more stringent default table.

2.1.3.3 A member pointed out the inappropriate use of the word “must” in Notes 2 and 3 in paragraph 4.2.3.1.1. The Secretary advised the meeting that this matter had already been drawn to UNSCETDG’s attention and it would be discussed at that body’s December, 2005 meeting. Some members were of the opinion that “must” should be changed to “should” immediately for the purposes of the Technical Instructions. Other members thought that the UNSCETDG did in fact intend these notes to be requirements and that a ruling by the sub-committee should therefore be awaited. The Secretary was requested to consult the UNSCETDG Secretariat on the matter as soon as possible to see if a decision could be reached immediately, otherwise to amend the Technical Instructions in accordance with any decision by the December Session in time for the 2007-2008 Edition. In similar vein, the word “must” was used in the new Note following paragraph 5.2.1. However, in this case it was also pointed out that “must” would more appropriately be replaced by “need only”. It was agreed that the Secretary should deal with this matter in a similar manner. Subsequent to this discussion, a response was received from the UNSCETDG Secretariat (see paragraph 2.13.4 of this report). The meeting was unable to take further action on the matter, which it delegated to the Secretary.

2.1.3.4 It was noted that the text of the note in Table 2-8 was not the same as in the UN Regulations. The Secretary mentioned that this had been noted before and a conscious decision had been made to use the present text. It was agreed that, for uniformity, the UN text should be used, but it was again noted that this text used the word “must”. However, it was suggested that since this was a footnote to the table and not a normal note for information, the use of “must” might be acceptable. It was agreed that the Secretary would draw this matter to UNSCETD’s attention.

2.1.4 **Part 3 — Dangerous Goods List (DGP/20-WP/6 and WP/12)**

2.1.4.1 It was agreed that the date in A14 should be 31 December 2010 and not 1 January 2011.

2.1.4.2 A member pointed out an inconsistency in the references to Class 3 and organic peroxides in A66. The Secretary agreed to amend the wording suitably.

2.1.4.3 A member wished to record his organization's dissatisfaction with the amendment to A98 which removed the pressure reference.

2.1.4.4 The suggestion was made that A150 was redundant because of changes to UN Recommendations and because A150 was not in fact used in Table 3-1. However, the Secretary pointed out that it had been omitted from Table 3-1 in error and would be inserted. The reference to A150 did, therefore, need to be retained.

2.1.4.5 The Secretary was commended for the clear presentation of the changes being made. Attention was drawn to further amendments/corrections which had been agreed but not yet incorporated.

2.1.5 **Part 4 — Packing Instructions (DGP/20-WP/7)**

2.1.5.1 It was pointed out that in the new paragraph 2.4 the word "should" needed to be changed to "must". This was agreed and the Secretary was requested to inform the UNSCETDG of the discrepancy.

2.1.5.2 It was noted that paragraph 2 c) of PI 650 had originally required a rigid outer packaging for UN 3373 but that the UNSCETDG had changed this to allow either a rigid outer or secondary packaging. This change had been reflected in DGP/20-WP/7. However, it was recalled that it had been confirmed at WG/05 that this change should not be made for air transport. In support of this it was recalled that the UN had introduced this change specifically for the road transport mode, and it was not an appropriate change for the air mode. The meeting agreed with this proposal and decided not to amend this paragraph. A second proposal in WP/88 to restrict other dangerous goods packed with infectious substances to those meeting the excepted quantities provisions was agreed. It was further agreed similar provisions should be included in PI 602.

2.1.6 **Part 5 — Shipper's Responsibilities (DGP/20-WP/8)**

2.1.6.1 Attention was drawn to paragraph 1.2.2.2 dealing with requirements for multilateral approvals for certain shipments of radioactive materials and the proposal in sub-paragraph c) to add the words "or in an aircraft" in the case of fissile materials where the sum of the criticality safety indices (CSI) exceeds 50. It was noted that this was a reflection of the UN text which used the words "freight container or conveyance." It was suggested that this requirement might be intended to cover the case where more than one freight container, from different shippers, with a combined CSI of greater than 50, was loaded on the same aircraft, although in such a case it was not clear who would be responsible for obtaining the approval. However, it was pointed out that in Part 7, consignments with CSI of greater than 50 are only permitted on the basis of exclusive use of the aircraft and so only one shipper would be involved. It was also pointed out that even with exclusive use, without the additional text a single shipper might be able to split a consignment of total CSI greater than 50 into two or more containers, each with a

CSI of less than 50, thus avoiding the need to obtain multilateral approval and avoiding the intent of the requirement. It was agreed that the new text would be added.

2.1.6.2 It was pointed out that, in view of the decision by the UNSCETDG and WG/04 and 05 to remove the requirement to apply limited quantity markings to appropriate packages, there was no need to retain the reference "limited quantities (where applicable)" in 2.4.10 a) dealing with the marking of overpacks. It was agreed that the reference should be removed. Furthermore, it was pointed out that the intent of 2.4.10 b) was fully covered in PI 650 and it was therefore agreed that 2.4.10 b) could be deleted.

2.1.6.3 It was agreed not to include the words "or size" in the new paragraph 3.2.7 e) since these words were not included in other similar text.

2.1.7 Part 6 — Packaging nomenclature, marking and tests (DGP/20-WP/9)

2.1.7.1 The temperatures (i.e. 20°C to 30°c) required for the hot water bath test for aerosol dispensers was queried as appearing to be unusually low. In response, it was pointed out that the test was only for plastic containers, which might be damaged by higher temperatures. Furthermore, the objective of the bath test was to raise the pressure in the container and not to test the container's integrity.

2.1.8 Part 7 — Operator's responsibilities (DGP/20-WP/10)

2.1.8.1 The restriction of 4.1.6 b) to cargo was queried, since incidents involving passenger baggage also occurred. However, it was pointed out that the paragraph referred to the provision of information by the operator in the event of an aircraft accident or incident and the operator would not be aware of dangerous goods in passenger baggage.

2.2 APPROVAL OF WORKING GROUP REPORTS

2.2.1 The meeting reviewed and approved the reports of working group meetings DGP-WG/04 and DGP-WG/05. It affirmed the proposals for amendments of the Technical Instructions at those meetings, subject to any subsequent changes made at this meeting.

2.3 PART 1 — GENERAL

2.3.1 Dangerous goods placed on board to provide medical aid to a patient in flight (DGP/20-WP/17)

2.3.1.1 The meeting considered possible changes to 1;1.1.3 to expand and clarify the provisions relating to dangerous goods placed on board to provide medical aid to a patient in flight, with particular reference to the transport of the goods on flights before and after that in which the patient was actually carried.

2.3.1.2 The meeting noted that while many States have national regulations covering this issue, these provisions vary considerably from State to State.

2.3.1.3 It became evident during the discussions that the principles involved could equally be applied in other cases (e.g. search and rescue operations) and it was therefore decided to attempt to develop generic provisions. These provisions would address:

a) information to the pilot-in-command;

b) approval by the operator;

c) inspection for damage or leakage prior to loading;

d) personnel training commensurate with their duties;

e) reporting requirements for accidents and incidents where the dangerous goods are involved;

f) marking and labelling;

g) requirement to notify emergency responders in the event of an emergency;

h) quantity of dangerous goods permitted;

i) supervision during loading; and

j) control of dangerous goods whilst in flight.

2.3.1.4 Based upon this outline, completely new text for 1;1.1.3 was developed. It was particularly noted that the provisions ensured that the pilot-in-command retained over-all control of the use of the materials at all times, at his discretion.

2.3.2 Dangerous goods packages opened by customs and other authorities (DGP/20-WP/18)

2.3.2.1 Proposed amendments to the Technical Instructions on this topic were presented which were the result of clarification and simplification of proposals previously discussed at DGP-WG/04. The proposed amendment was agreed as being an improvement on the present text, but a number of outstanding issues remained, as follows:

a) there was a doubt concerning who would legally be the shipper after a package had been opened and re-closed before continuing its journey, and this could give rise to liability problems in the event of a subsequent accident or incident;

b) after opening and re-closing, the package needed to carry some clear indication that it had been opened; and

c) it needed to be established clearly who would be responsible for any costs incurred in the opening/re-closing process.

2.3.2.2 It was suggested that some guidance material on this matter would be valuable and a member agreed to prepare some draft material.

2.3.2.3 The Secretary informed the meeting that the ICAO Facilitation Section, which deals with customs-related issues, had suggested that a paper on the topic be prepared for the World Customs Organization (WCO) Permanent Technical Committee Meeting to be held in March 2006. It would be useful to have the guidance material available in time for that meeting.

2.3.3 **Radioactive materials**

2.3.3.1 **Multilateral approval (DGP/20-WP/29)**

2.3.3.1.1 At the DGPWG/05 meeting, a question had been raised as to justification for removing the word "international" from paragraph 1;1.4.4.2 of the Technical Instructions. This was a reflection of a change by the International Atomic Energy Agency (IAEA) and justification for it had been sought from the agency. The agency's justification had been obtained and was noted by the meeting.

2.3.3.2 **Excepted packages of radioactive materials with other hazardous properties (DGP/20-WP/63)**

2.3.3.2.1 Attention was drawn to the case of packages containing radioactive materials which have other hazardous properties but which meet the excepted quantity limitations in both cases. While the packaging of such substances is not a problem, difficulties have arisen over their labelling. Part 2, paragraph 4.2 of the introductory chapter indicates that for such materials, the non-radioactive hazard takes precedence. Consequently, some shippers only apply the marking "Dangerous goods in excepted quantities". This creates problems for States with special licensing requirements for radioactive packages in excepted quantities and also does not give emergency services all the information they might require. Some shippers, however, only apply the radioactive excepted quantities marking and yet others apply both.

2.3.3.2.2 Two alternative solutions for overcoming this confusion were proposed. The first was to require both sets of markings and the second was to require markings appropriate for the radioactive materials only. Some members preferred the first proposal since it provided the maximum amount of information for emergency response staff, however, the majority of members preferred the second solution.

2.3.3.3 **Inspection of radioactive shipments (DGP/20-WP/91)**

2.3.3.3.1 A member drew the meeting's attention to an incident which occurred in 2001 involving leakage of Iridium-192 from an interior container during air/road transport. There was no exterior evidence of the leak but there had been a potentially dangerous release of radiation. He considered that this incident showed that the Technical Instructions' requirements for an operator to inspect packages before loading and after unloading were clearly not effective in such cases of interior leakages of radioactive material where there were no exterior indications.

2.3.3.3.2 He consequently proposed that an operator should be required to conduct an actual measurement of relevant radioactive material packages before loading and after unloading. He suggested

that use might be made of new technology becoming available (mainly for security purposes) which allowed the continuous tracking and radiation monitoring of packages via satellite.

2.3.3.3.3 The observer from IAEA considered that this was a matter which should be dealt with by IAEA and mentioned the severe test procedures (equivalent to an accident) which any tracking device would have to survive.

2.3.3.3.4 Another adviser who had detailed knowledge of the incident informed the meeting that probably it had been caused by vibration during the transport and that shortcomings in the packaging requirements had since been remedied. He reported that a radiation measurement had in fact been carried out on the flight deck of the aircraft in question before departure and had shown zero exposure.

2.3.3.3.5 Although a few members had sympathy with the proposal, the majority considered it was unnecessary and impractical. Measuring and interpreting radiation levels was a complex process and would require the specialized training of many airline staff. If the satellite monitoring of packages could be arranged, it was not clear who would monitor the radiation levels and what action could be taken as a result. Instrument calibration and background radiation levels were other perceived problems.

2.3.3.3.6 The member making the proposal understood the difficulties, but since he considered this to be a safety issue, he regretted that no action could be proposed by DGP.

2.3.3.4 IAEA activities (DGP/20-WP/92)

2.3.3.4.1 The IAEA representative informed the meeting of the main decisions taken at the Eleventh Meeting of the IAEA Transport Safety Systems Committee held in September 2005. Of principal interest to the DGP was the discussion on orientation labels. The committee concluded that there would be no benefit in applying orientation labels to the vast majority of Class 7 packages and consequently recommended that such labels should not be required for Class 7 packages. The meeting noted this recommendation; it also noted that no consequential action by DGP was required since the Technical Instructions do not require orientation labels for Class 7 packages.

2.3.4 Dangerous goods in airmail

2.3.4.1 The meeting was advised that the Universal Postal Union (UPU) was in the process of amending its Convention to prohibit the transport of Category A infectious substances in air mail. An amendment to 1;2.3 was therefore agreed to align the Technical Instructions with the UPU Letter Post Manual.

2.3.5 Training

2.3.5.1 Training and the definition of cargo (DGP/20-WP/25)

2.3.5.1.1 It was recalled that at the second working group meeting (DGP-WG/05) an anomaly had been identified with regard to training of persons engaged in the loading and unloading of cargo, which had arisen because there was no definition of cargo in the Technical Instructions and also, when defined in other ICAO material, “cargo” did not include mail or stores. Discussions at DGP-WG/05 had indicated that the Technical Instructions should contain the ICAO standard definition of cargo and also that persons

engaged in loading and unloading mail or stores should receive appropriate dangerous goods training. Proposals for amendment of the Technical Instructions to cover these points were therefore proposed.

2.3.5.1.2 The current ICAO definition of cargo was incorporated into the text, but it was questioned whether a definition was really required for this purpose. It was suggested that it would be adequate to require that handlers of cargo and mail be adequately trained and a precise definition of cargo was not necessary for this purpose. There was some support for this point of view, but most members preferred to include a definition.

2.3.5.1.3 Some difficulty was expressed in understanding the meaning of the word "stores", especially for people whose mother tongue was not English or one of the other ICAO official languages. It was generally agreed that the intention of including "stores" was to cover an operators' non-revenue goods placed aboard an aircraft which could sometimes include dangerous goods (e.g. aircraft batteries). In some regions such goods are described by the expression "COMAT".

2.3.5.1.4 It was agreed that the existing ICAO definitions of cargo, mail and stores should be included in 1;3.1.1 of the Technical Instructions.

2.3.5.2 Frequency of dangerous goods training (DGP/20-WP/31)

2.3.5.2.1 At DGP/19 an inconsistency between the requirements of Annex 6 and the Technical Instructions with regard to the frequency of recurrent dangerous goods training for cabin staff had been noted. The Secretary noted that this had been drawn to the attention of ICAO's Operations Panel (OPSP) which had subsequently agreed to propose an amendment to Annex 6 (at its meeting in May 2006) to align that document with the Technical Instructions.

2.3.5.3 Instructor qualifications (DGP/20-WP/71)

2.3.5.3.1 It was noted that Chapter 4 of Part I of the Technical Instructions sets out provisions for dangerous goods training programmes. This includes a description of the types of programmes that must be established, the curricula for these programmes and, in Table 1-4, the content of training courses for twelve categories of personnel. However, nowhere in Chapter 4 is there any mention of instructors of these dangerous goods programmes and the training requirements/qualifications that these instructors should possess. New text outlining the necessary qualifications for instructors for inclusion in Chapter 4 was therefore proposed.

2.3.5.3.2 The large majority of members welcomed this proposal. Several members indicated that such requirements were already in force in their States and that the proposed provisions were sufficiently broad to encompass existing State requirements. Some editorial changes were suggested and the question of controlling self-study programmes was also discussed. It was agreed to accept the new text, but it was mentioned that it might be necessary to elaborate upon it in the future.

2.3.5.4 Development of competency standards for dangerous goods personnel (DGP/20-WP/74)

2.3.5.4.1 The Secretariat described to the meeting the well-established use in ICAO training materials of a competency-based approach. It was noted that the Technical Instructions already required the need to "verify understanding following training" but this was an academic approach which did not

ensure a person was adequately trained to actually perform duties safely in the workplace. DGP was therefore requested to consider developing the competency approach to measuring a student's capabilities after receiving dangerous goods training.

2.3.5.4.2 Most members supported this idea and confirmed the value of a more practical assessment of a student's knowledge. It was agreed that this would have to be a future work programme item and would probably need the establishment of a dedicated working group to undertake it. It was agreed that it would be useful to collect and distribute to members all the available literature on the subject as soon as possible. It was noted that a wide range of personnel required training in various aspects of the transport of dangerous goods and there would need to be some prioritization of the work.

2.4 PART 2 — CLASSIFICATION OF DANGEROUS GOODS

2.4.1 Infectious substances

2.4.1.1 Addenda to the Technical Instructions (DGP/20-WP/13)

2.4.1.1.1 A consolidation of the two addenda to the Technical Instructions developed since DGP/19, intended for inclusion in the 2007/2008 Edition, was presented for the meeting's review and approval. The meeting was informed of the Air Navigation Commission's concern at the issuance of a second addendum and its request to members to ensure that timely coordination take place between State authorities and medical experts when amendments to infectious substances provisions in the Technical Instructions were being considered.

2.4.1.1.2 It was noted that there was no mention of genetically modified specimens in 6.3.1.5. The meeting was reminded that all such references had been transferred to Part 2, Chapter 9 of the Technical Instructions.

2.4.1.1.3 It was also mentioned that it was not clear from its use in paragraph 6.3.2.3.6 that the expression "patient specimens" included specimens from animals as well as from human beings. It was pointed out that this was clearly stated in 6.3.1.4, and elaborated upon in the guidance material.

2.4.1.1.4 The Secretary presented (DGP/20-IP/7) the guidance material on the transport of infectious substances that had been developed. Members welcomed the material and thanked the authors for their efforts. The hope was expressed that it could be translated and disseminated quickly in view of the fact that it was only valid until 31 December 2006. Members reviewed the text and suggested a number of mainly editorial amendments. One point generating considerable discussion was that the document did not state what its target audience was intended to be. A suggestion was made to include examples of the personnel who should receive training, but the consensus was that this might appear to limit the training need to only those categories of staff mentioned and no change was therefore agreed. It was agreed that members would be able to actively promote its use in the appropriate areas. The revised text of the guidance material is shown in Appendix A to this part of the report.

2.4.1.1.5 Attention was drawn to the title of paragraph 6.3.2.3 "Exemptions". It was noted that this was the word used in the UN Regulations, but since "exemption" had a specific meaning in the Technical Instructions, the word "exception" was thought to be preferable. The meeting agreed.

2.4.1.2 **Exempt human or animal specimens in passengers' baggage (DGP/20-WP/73)**

2.4.1.2.1 The meeting was informed of concerns in one State over the transport of exempt human or animal specimens in passengers' baggage and the possible exposure of airport staff to such specimens. The meeting was invited to discuss whether such specimens should be allowed in baggage.

2.4.1.2.2 Several members were of the opinion that such specimens should not be allowed. Specimens could be from asymptomatic but nevertheless infected people or animals and be an inherent danger. It was also noted that there were no quantity limits and consequently quite large quantities might be in baggage. Some operators were already known to be refusing to carry such specimens in baggage. Everything depended on proper packing and there was no guarantee that this was the case.

2.4.1.2.3 The alternative view was that this was a vital means of moving specimens rapidly for analysis and to curtail it would have serious consequences in the medical field. Moreover, the packing requirements were quite stringent and there had been no known incidents of contamination so far, and it should be allowed to continue to gain more experience before taking action. The meeting was informed that the opinion of the Chief of ICAO's Aviation Medicine Section was that the probability of release and infection was so low that there was no need to change the provision.

2.4.1.2.4 Members were equally divided on this issue and consequently no change to the provisions was made. A member subsequently expressed the view that it would be unfortunate if State and operator variations arose in relation to this matter.

2.4.2 **Packing group for corrosive substances (DGP/20-WP/57)**

2.4.2.1 A member drew attention to apparent anomalies in the packing groups assigned to highly corrosive substances, both alkaline and acid, in the dangerous goods list. According to Organisation for Economic Co-operation and Development (OECD) guidelines for the testing of chemicals (No. 404, Acute dermal irritation/corrosion, 1992), substances with a pH value lower than 2 or greater than 11.5 were considered to pose a high danger of corrosion and should be in Packing Group I. A number of examples of such substances from the dangerous goods list were presented, all of which were in Packing Groups II and III. Some of the substances were highly corrosive to airframe structural materials and some incidents of such corrosion were quoted which had resulted in the aircraft having to be scrapped.

2.4.2.2 A further anomaly was suggested in the Table 3-1 entries for **Sulphuric acid** with more than 51% acid (UN1830) and with not more than 51% acid (UN2796), both of which had exactly the same packing group, packing instructions and quantity limitations.

2.4.2.3 No specific proposals were made to overcome the perceived problems, but the meeting was invited to review the substances with a view to introducing a higher level of packing group where necessary.

2.4.2.4 In response, it was suggested that the pH level was only seen as giving guidance on the corrosivity of a material, in the absence of animal or other tests. Use of Packing Group I would not in fact make a very significant difference to the packaging of these substances, probably only the need for a more severe drop test. As it was, all the anti-leakage provisions that would be applied were already required. Furthermore, for air transport, the packing instructions already included many of the requirements that

would be attached to a higher packing group. The proposal would doubtless lead to problems of inter-modality and would have to be handled by the UNSCETDG. In support of this viewpoint, another member wondered whether, in the incidents quoted, the commodities had actually been packed in accordance with the Technical Instructions.

2.4.2.5 The meeting agreed to take no action on this issue and the member introducing the subject agreed to consider it further and return with it to the DGP in the future if necessary.

2.5 PART 3 — DANGEROUS GOODS LIST AND LIMITED QUANTITY EXCEPTIONS

2.5.1 Dangerous evolution of heat (DGP/20-WP/16)

2.5.1.1 A member drew attention to Part 1;2.1 of the Technical Instructions which forbids the carriage by air under any circumstance of, *inter alia*, substances which are liable to produce a dangerous evolution of heat. This is a reflection of paragraph 1.1.3.1 of the UN Model Regulations. An enquiry had recently been received from a shipper who wished to transport a kit comprising two substances which, when mixed together, caused the evolution of 230°C. It was queried whether this was a "dangerous evolution of heat". To answer this the classification criteria for UN3258 **Elevated temperature solid**, **n.o.s.** was considered and in view of the fact that a substance need only be classified as UN3258 if the temperature exceeds 240°C, substances with a lesser temperature were therefore not regulated (from a temperature point of view) and so the substance in question had been judged not to produce a "dangerous evolution of heat". This issue highlighted the subjectivity of Part 1;2.1 which effectively made this text unenforceable and the meeting was invited to address the matter.

2.5.1.2 A possible solution offered was to amend the entries in Table 3-1 for UN3256 **Elevated temperature liquid, flammable, n.o.s**, UN3257 **Elevated temperature liquid, n.o.s**, and UN3258 **Elevated temperature solid, n.o.s** such that they would be forbidden for carriage under any circumstance. Part 1;2.1 could then be similarly amended to reflect this, removing the need for any subjectivity. It was suggested such a change would have a minimal effect on multi-modal harmonization since it is considered unlikely that such substances (e.g. bitumen) would ever be carried by air. Furthermore, it should be borne in mind that no guidance exists for States in determining what conditions should be included in an exemption, under which these substances could currently travel. Given the potential danger of a leakage of such a substance, it was suggested it would be far safer to forbid the carriage of elevated temperature substances under any circumstance.

2.5.1.3 While there was understanding of the problem posed to the authority, the matter was considered to be complex and, since it was a multimodal issue, it needed to be considered by the UNSCETDG. In particular, the temperature limits might be difficult to establish. It was noted that in most aircraft the high temperature warning sensors in the air conditioning systems were set at approximately 200°C, at which temperature the aluminium alloys used in airframe construction were known to begin to deteriorate. Concerning the proposed solution, it was stated that since there had been no known problems apart from the one mentioned, it would not be appropriate to make any changes at present.

2.5.1.4 The member making the original proposal agreed to withdraw and reconsider it for possible future consideration, because he still felt that authorities would benefit from more definitive advice on the topic.

2.5.2 **Alternative proper shipping names (DGP/20-WP/36)**

2.5.2.1 A member drew attention to the dangerous goods list entries for **Methyl ethyl ketone** and **Ethyl methyl ketone** which were the same substances but which appeared under both names in the dangerous goods list with otherwise identical details. He considered this to be confusing and suggested that the meeting should choose one name as the proper shipping name and use the other as an alternate with only one full entry in the list and a cross reference, as was done in the UN list.

2.5.2.2 In response it was recalled that the DGP had decided deliberately several years ago to have a full double entry so that users of the document would find the required information immediately whichever name they used.

2.5.3 **UN numbers based upon concentration (DGP/20-WP/37)**

2.5.3.1 The meeting's attention was drawn to several entries in the dangerous goods list where the UN number varied according to the concentration of the substance. In most cases these were comprehensive and complete in themselves, either by means of special provisions or by descriptive text following the proper shipping name. However, there were a number of instances where numbers were provided for some concentrations of the substance, but not for others. An example given was ammonia solution where three UN numbers were provided for concentrations of 10% to 35%, 35% to 50% and more than 50%, but there was no entry for concentrations of less than 10%. The member considered this to be an illogical situation which caused confusion for shippers and authorities alike.

2.5.3.2 The consensus among members was this was not a matter that warranted any change to the Technical Instructions. The responsibility for classifying dangerous goods was clearly that of the shipper and where any doubt existed it was the shipper's responsibility to seek expert chemical advice. If, for example, a low concentration did not have a UN number, it could not be assumed that the material was unregulated since it might fall into one of the generic entries for dangerous goods.

2.5.4 **Ethylene oxide UN 1040 (DGP/20-WP/38)**

2.5.4.1 It was recalled that at WG/04, **Ethylene oxide** had been made forbidden on cargo aircraft (it was already forbidden on passenger aircraft) on account of its toxicity. Notwithstanding its Forbidden/Forbidden status, the dangerous goods list still carried the provision A131 against the entry. This appeared to be an anomaly but it was in fact deliberate and was intended to allow the transport of sterilization devices on cargo aircraft. To clarify the matter and remove any doubt from a user's mind that the dangerous goods list might be in error, it was proposed to make an amendment to special provisions A131.

2.5.4.2 Members agreed with the proposal and it was suggested that there may be other entries which required similar treatment. These would be checked and any necessary amendment made. It was noted in passing that the entry for **Ethylene oxide** in the Supplement contained errors which would be corrected.

2.5.5 **Hydrogen in a metal hydride storage system (DGP/20-WP/39)**

2.5.5.1 **Hydrogen in a metal hydride storage system** (UN 3468) is currently Forbidden/Forbidden in the Technical Instructions but it was agreed at DGP-WG/05 to allow transport under exemption (i.e. under Special Provision A2) and a member agreed to develop an appropriate packing instruction. The member, on further consideration, was of the opinion that the substance could be allowed on cargo aircraft under properly controlled conditions. He consequently now proposed appropriate entries for the dangerous goods list and a corresponding packing instruction.

2.5.5.2 The majority of members approved the proposal without change.

2.5.6 **Outer packaging quantity anomalies**

2.5.6.1 It was pointed out that the maximum net quantity limits for three substances in the dangerous goods list were not in accordance with the panel's own guidelines and it was proposed to rectify this situation. If these changes were not made, these substances would become exceptions to the newly-proposed packing instruction system. The meeting agreed to the changes.

2.5.7 **Special provisions**

2.5.7.1 **Special Provision A6 (DGP/20-WP/50)**

2.5.7.1.1 A member noted that Special Provision A6 is assigned to fifteen pesticide entries with specific names and a further thirty-four with generic names in the dangerous goods list. The fifteen specifically named substances all have a Class 3 primary risk and a Division 6.1 subsidiary-risk, while the generic entries all have a Division 6.1 primary risk and in some cases a Class 3 sub-risk. Special Provision A6 states that when offered for carriage as pesticides, these substances must be carried in accordance with the pesticide provisions. Since all these substances carry the word "pesticide" in the proper shipping name, Special Provision A6 was considered to be redundant and could be deleted. It was also noted that the equivalent UN special provision was not assigned to these entries in the UN Model Regulations. It was noted that A6 needed to be retained for a number of similar generic entries which did not include "pesticide" in their proper shipping names. The meeting agreed with this proposal.

2.5.7.2 **Special Provision A32 (DGP/20-WP/76)**

2.5.7.2.1 A member drew attention to Special Provision A32 which states that air bags in vehicles or completed vehicle components are not subject to the provisions of the Technical Instructions. However, air bags are being used in increasingly novel ways (e.g. boats, light aircraft) and it was understood this was the reasoning behind the UN decision to change "vehicle" to "conveyance". A consequence of Special Provision A32 was that items of this nature may be carried in passenger baggage and it was suggested that it would be prudent to qualify the Special Provision such that air bags must not be capable of inadvertent activation. A32 is a reflection of UN Special Provision 289; however, it is suggested that the air mode would be justified in taking a more conservative approach.

2.5.7.2.2 The proposal was agreed with editorial changes. It was also agreed that the UNSCETDG should be informed.

2.5.7.3 **Special Provision A67 (DGP/20-WP/64)**

2.5.7.3.1 A member described difficulties in applying Special Provision A67, which establishes the conditions under which non-spillable batteries can be carried without meeting the requirements of the Technical Instructions. The particular difficulty arose with interpreting the expression “and where there is no free liquid to flow”. Some batteries have free liquid with an absorbent material such that the liquid would not actually flow out of a cracked or ruptured battery case. It was suggested that absorbed liquids are not free and an amendment to A67 to clarify this was suggested.

2.5.7.3.2 It was also proposed to elaborate on the means of avoiding short circuits. To facilitate acceptance of batteries meeting the requirements of A67, it was further proposed that they be plainly marked as “NONSPILLABLE”.

2.5.7.3.3 There was general agreement on the proposals concerning free liquid and short circuit protection. However, a number of questions were raised over the marking proposal. It was noted that this was a UN special provision, although the perceived problem was largely in the air mode. Moreover, some of these batteries might be in outer packagings but others might not. It was also suggested that battery manufacturers would need to be allowed a transition period before any change become applicable. It was generally agreed that UNSCETDG involvement would be necessary, but there was some debate as to whether the Technical Instructions should be changed as an interim measure. There was no consensus on many of these issues and the member concerned decided to withdraw the proposal and approach the UNSCETDG before any action was taken by the DGP.

2.5.7.4 **Special Provision A70 (DGP/20-WP/47)**

2.5.7.4.1 The meeting’s attention was drawn to an anomaly in Special Provision A70. This provision applies in the dangerous goods list to internal combustion engines fitted to vehicles as well as such engines shipped alone. The special provision indicates that machines or apparatuses containing internal combustion engines are not subject to the Technical Instructions if the fuel tank has never contained fuel. However, it does not mention internal combustion engines shipped alone which it logically should. It was therefore proposed to add a reference to engines shipped alone to Special Provision A70. The meeting agreed with this proposal.

2.5.7.5 **Special Provision A75 (DGP/20-WP/53)**

2.5.7.5.1 Attention was drawn to the carriage of UN 2014 **Hydrogen peroxide, aqueous solution** with more than 40% but not more than 60% hydrogen peroxide which is forbidden in passenger and cargo aircraft except under the Special Provisions A2 and A75. Special Provision A75 allows articles such as sterilization devices, when containing less than 30 mL per inner packaging with not more than 150 mL per outer packaging, to be transported as excepted quantities, “*provided such packagings were first subjected to comparative fire testing. Comparative fire testing must show no difference in burning rate between a package as prepared for transport (including the substance to be transported) and an identical package filled with water.*” Difficulties had been experienced in one State providing more information to shippers enquiring about acceptable comparative fire tests. Furthermore, there was a doubt that such testing would cover the risk associated with such small quantities of hydrogen peroxide. It was therefore proposed to delete the reference to the fire test from A75.

Editorial Note.— Consequential amendment to WP/38. A75 applies to UN 2014 **Hydrogen peroxide, aqueous solution** with more than 40% but not more than 60% hydrogen peroxide (stabilized as necessary)

2.5.7.5.2 Some members could accept this deletion, but others believed that there was considerable information available on comparative fire testing that could be used.

2.5.7.5.3 It was suggested that there was further confusion because it was not clear whether the sterilization devices were considered to be an inner packaging which could then be packed in an intermediate packaging, or whether they were articles individually packed in an inner packaging of a combination package. Furthermore, it was noted that Special Provision A2 also applied to these items and the logic of applying the limited quantity provisions was questioned if a copy of a document of approval had to accompany the shipment. It was therefore proposed that these articles should be packed in a metal (IP.3 or 3A) packaging, with adequate non-combustible absorbent material, under normal (i.e. not excepted quantity) transport conditions.

2.5.7.5.4 Some members considered this a safety enhancement, but the majority disagreed. It was considered that there had been a great deal of positive experience in transporting these items as excepted quantities and there was no wish to prevent this in the future.

2.5.7.6 **Special Provisions A121 and A134 (DGP/20-WP/46)**

2.5.7.6.1 It was pointed out that UN 3166 (**Engines, internal combustion**), for which there were two entries in the Technical Instructions, requires Special Provisions A121 and A134 to be met. It was recalled that A134 was added to align with UN Special Provision 314; however, it was noted that A134 contains the same requirement as A121 as well as additional requirements covering hybrid vehicles. There therefore appeared to be no need to retain A121.

2.5.7.6.2 It was agreed that A121 could be deleted. It was also noted, however, that there was a difference between the UN Regulations and the Technical Instructions in the proper shipping names. The UN had recognized that the transport of internal combustion engines was only a concern of the air mode and it was agreed that the UNSCETDG should be requested to align their proper shipping names with ICAO's. A member agreed to bring the matter to the sub-committee's attention.

2.5.7.7 **UN Special Provision 191 (DGP/20-WP/87)**

2.5.7.7.1 The panel had previously noted that although UN Special Provision 190 had been incorporated into the Technical Instructions as Special Provision A98, UN Special Provision191, which applied to UN 2037 (**Receptacles, small, containing gas** (non-flammable) without a release device, non-refillable) was missing from the Technical Instructions. It was consequently being proposed to add this United Nations special provision to the Technical Instructions.

2.5.7.7.2 It was suggested that with a small amendment, Special Provision A98 could be used to cover UN Special Provision 191. It was then pointed out that this course of action had been agreed already (at DGP-WG/03) but did not appear to have been implemented. It was agreed that it should be implemented in the 2007-2008 issue of the Technical Instructions.

2.5.8 **Excepted quantities**

2.5.8.1 **Prohibition of certain substances from transport in limited quantities (DGP/20-WP/83)**

2.5.8.1.1 A member advised the meeting that a recent review of certain materials authorized as limited quantities in the Technical Instructions revealed that some were not authorized in limited quantities in the UN Model Regulations. These were mainly substances which released toxic/corrosive gas when in contact with water. It was proposed that these no longer be allowed in limited quantities in the Technical Instructions. The meeting agreed with this proposal.

2.5.8.2 **Intermodal aspects (DGP/20-WP/40)**

2.5.8.2.1 During DGP-WG/05, members had indicated general support for revising the limited quantity provisions in the Technical Instructions in order to avoid confusion in modal regulations. It was noted that the use of the term “limited quantities” was misleading as provisions for air transport were markedly different to those for other modes. In order to reduce confusion, it had been suggested consideration be given to adopting a new name and it was agreed the issue needed further discussion. The Technical Instructions uses the terminology “limited quantities” but the requirements in the Technical Instructions are significantly different from the limited quantity provisions in the UN Model Regulations and in the regulations of the other modes. In particular, limited quantities prepared in accordance with the Technical Instructions are required to bear hazard labels and the inner packaging quantities are much less than those permitted in other modes of transport. The only exception provided in the Technical Instructions for limited quantities is that packages are not required to be tested and marked in accordance with Part 6, Chapter 4, although according to 3;4.4 they must be capable of passing a 1.2 m drop test and a 24-hour stacking test. Among other things, it was consequently proposed to amend the Technical Instructions by removing references to the words “limited quantities” and to amend requirements for limited quantities accordingly.

2.5.8.2.2 Members did not consider that this would solve the main problem which arose because the road mode had not aligned with the UN. A further comparison of the Technical Instructions provisions with the UN Regulations had shown that:

a) all the products now allowed under the ICAO provisions for limited quantities are allowed under the UN provisions for limited quantities;

b) the quantities allowed for limited quantities in the Technical Instructions fall within the limits authorized under the UN limited quantities provisions;

c) both ICAO and the UN allow a maximum gross mass of the package of 30 kg;

d) in the UN as well as in ICAO, packages must comply with the specified construction requirements and single packagings cannot be used. UN Specification Packagings are not required; and

e) the provisions for documentation exist in the Technical Instructions as well as in the UN Recommendations.

2.5.8.2.3 The major differences between the Technical Instructions and the UN Recommendations are:

a) full marking and labeling compliance is required by the Technical Instructions; and

b) the Technical Instructions require packages to be capable of withstanding a 1.2 m drop test and a 24-hour stacking test.

2.5.8.2.4 Since the differences noted above indicate that the Technical Instructions are more stringent than the UN Recommendations, it was suggested that packages prepared according to the Technical Instructions should be acceptable to other modes, provided the packages were made easily recognizable by marking them with the UN number placed inside a diamond outline. It was also suggested that the UNSETDG should be requested to add a Note to its recommendations that for air transport, hazard warning labels must be applied.

2.5.8.2.5 Several members were in favour of the proposal in principle, although concerns were raised that the limited quantity provisions were becoming more complicated; also that these packagings could be quite small and there might be some difficulty affixing another marking. It was also questioned whether a Technical Instruction provision should be mandatory or not. It was agreed that it would have to be mandatory.

2.5.8.2.6 After further discussion, it was agreed to add a requirement to the Technical Instructions (in 5;2.4.1.1). A member also agreed to raise the matter at the July 2006 meeting of UNSCETDG.

2.5.9 **Environmentally hazardous substances**

2.5.9.1 **Alignment with UN Model Regulations**

2.5.9.1.1 It was noted that to align with the UN Model Regulations it was proposed (DGP/20-WP/5) to amend 2;9.2.1. Some changes to this text were suggested, particularly with respect to the limitation to the “aquatic” environment. It was agreed to develop a revised text for the meeting’s review.

2.5.9.1.2 A proposal had also been made (in DGP/20-WP/6) to amend Special Provision A97. This amendment made the classification of substances as environmentally hazardous optional for air transport (since they were not a danger to aviation itself). It was suggested (DGP/20-WP/84) that this would lead to intermodal confusion and the option should be removed. The majority of members agreed to retain the optional nature of the text.

2.5.9.1.3 The need was also agreed to align the quantity limitations for the various inner receptacles in Packing Instructions 911, Y911, 914 and Y914 with the UN values (DGP/20-WP/19 and WP/84).

2.5.9.2 **Quantity limits (DGP/20-WP/70)**

2.5.9.2.1 Attention was drawn to a number of entries in the dangerous goods list where the maximum net quantity in columns 10 and/or 12 was shown as “No limit” and in most cases this was understandable. However, for UN 3077 **Environmentally hazardous substance, solid, n.o.s.*** and

UN 3082 **Environmentally hazardous substance, liquid, n.o.s.***, the substances must be contained in combination or single packagings as permitted by Packing Instructions 911 and 914. However, the permitted packagings themselves have volume or mass capacity limits which impose a de facto limit on the maximum quantity limits in Columns 10 and 12. Changes to Columns 10 and 12 for UN 3082 and UN 3077 from "No limit" to 450 L and 450 kg respectively were proposed.

2.5.9.2.2 This amendment was agreed, although it was not considered to be a practical problem and the same situation might also exist in other cases.

2.5.9.3 Marking of packages of environmentally hazardous substances (DGP/20-WP/75)

2.5.9.3.1 A shipper now had the option (for air transport) to classify a consignment of environmentally hazardous substances as either dangerous goods or unrestricted goods (see 2.5.9.1.2 above). If the shipper chooses not to declare his dangerous goods for air transport, difficulties are likely to be encountered upon acceptance at the airport, because operator staff will see a UN number etc, marked on the package for the other modes and will consequently believe they have been presented with undeclared dangerous goods since the package will not be accompanied by a Dangerous Goods Transport Document. It is suggested that a package marking advising that the package is in accordance with Special Provision A97 would help to avoid potential confusion.

2.5.9.3.2 Some members disagreed with this proposal. They considered that a shipper should be aware of the multimodal interface problem and classify the shipment in the same way for all modes. The alternative of removing labels etc. for the air segment was clearly impractical.

2.5.9.3.3 The proposer pointed out the illogicality of this situation. It was a fact that almost all dangerous goods shipments travelling by air were multimodal in that they were carried to the airport by road and taken away from the destination airport also by road. For the road sectors, it was necessary to classify the materials as dangerous goods, but for the air sector shippers would be reluctant to do so because of the costs involved. However, although Special Provision A97 allowed air shippers not to classify these substances as dangerous goods, they were virtually forced to do so because of the intermodal marking/labelling problems that might arise.

2.5.9.3.4 The proposer withdrew his suggestion in light of the opposition, but still believed that some action was needed to facilitate the transfer of these materials between modes. He agreed to review the matter and possibly present alternative text.

2.6 PART 4 — PACKING INSTRUCTIONS

2.6.1 Compatibility of packing materials (DGP/20-WP/34)

2.6.1.1 It was recalled that the subject of compatibility of packaging material had been discussed at DGP/19. That meeting had agreed that the proposed amendments to the Technical Instructions (Part 4;1.1.3) were potentially valuable, but they had intermodal implications and should first be referred to the UNSCETD for discussion. This had been done; however, the sub-committee had decided to retain the general provisions of the Model Regulations, leaving the individual modes to extend these provisions as they considered necessary.

2.6.1.2 A revised and expanded version of 4;1.1.3 had therefore been developed and was presented to this meeting for review. The meeting was in agreement with the revised text in principle, but several comments were made on the details. A major difficulty was that some of the text was more in the nature of advisory material than regulatory text. A revised version of the text was subsequently prepared and reviewed. It was generally acceptable, but some members had difficulty with the proposal (in the new paragraph 1.1.3.3) that shippers should take developing technologies into account in satisfying themselves in regard to compatibility. The proposer of the text indicated that the need to take new technology into account was central to the revised proposal. While not denying the role of new technology, most members considered it was implicit in the requirements and that it was unnecessary to include it. Attempts to draft a text meeting all viewpoints were unsuccessful and the proposer consequently agreed to the deletion of the reference. The remainder of the revised text was agreed with some editorial changes.

2.6.2 **Pressure differential**

2.6.2.1 **Test methods (DGP/20-WP/52)**

2.6.2.1.1 It was recalled that at DGP-WG/05 it had been noted that some pressure differential test methods were not adequate for ensuring that a packaging would meet the provisions of 4;1.1.6 and Packing Instructions 602 and 650. Pending a further discussion of pressure differential issues which could not be undertaken at this meeting, it was proposed to add explanatory notes to 4;1.1.6 and Packing Instruction 602 and 650. Specifically, this would mention that an external vacuum test was not acceptable for flexible packagings, packagings filled or closed at an absolute pressure lower than 95 kPa and packagings intended for the transport of high vapour pressure liquids.

2.6.2.1.2 Some members did not consider this proposal would be very helpful and noted that further work on the general topic needed to be undertaken. The majority of members, however, considered that this would be a useful interim measure while further work was in progress.

2.6.2.2 **Transport of dangerous goods in un-pressurized cargo holds (DGP/20-WP/82)**

2.6.2.2.1 A member mentioned incidents had occurred in his State where packages of dangerous goods carried in un-pressurized cargo holds had been damaged by the changes of pressure. To prevent this in the future, he suggested amendments to Note 3 of the introductory notes to Part 4 indicating that testing to increased pressure differentials would be required if dangerous goods were to be transported in un-pressurized holds.

2.6.2.2.2 Some members did not consider this to be a problem since most transport in un-pressurized aircraft was in small aircraft which flew at relatively low altitudes where the pressure differential from ground level was not great. However, it was pointed out that there were some aircraft, typically large turboprop types, with un-pressurized holds which commonly flew at over 30,000 ft. Moreover, some members reported seeing packaging failures — usually of empty drums — which had been in pressurized holds. It appeared that these had usually occurred on drums which had not been sealed carefully (being empty) which lost air at cruise altitude but became sealed and collapsed during descent.

2.6.2.2.3 Members generally were unwilling to make any changes to the Technical Instructions before receiving more detailed and specific information on the type of failures that had taken place so that the matter could be analysed more thoroughly.

2.6.2.3 It was pointed out that the problems of pressure variation in relation to packaging were already referred to in Introductory Note 3 to Part 4. However, it was noted that pressure tests are only required on packagings intended for liquids. In view of the examples of pressure damage to packages containing solids which had been provided, it might be appropriate to look into the pressure testing of such packagings in the future. It was agreed to review this topic again during the next biennium.

2.6.3 **Empty packagings (DGP/20-WP/58**)

2.6.3.1 Attention was drawn to the provisions of the Technical Instructions relating to the transport of empty packagings and the fact that these packagings include cylinders used for Class 2 gases and containers of cryogenic liquids. Since the goods contained in these packagings may have been gases normally found in the air (e.g. helium, neon, nitrogen), it did not appear to be necessary to require them to be cleaned etc. before being shipped empty and unpressurized. New notes for 5;1.6.1 were therefore proposed to clarify this issue.

2.6.3.2 Members considered this to be an unnecessary addition to the Technical Instructions since it would normally be covered by an authority in an interpretation of the regulations. Moreover, it had been partially covered already by the addition of a new paragraph 2;2.2.1 in line with UN Model Regulations. It was agreed that no further changes to the Technical Instructions were necessary.

2.6.4 **Packing instructions**

2.6.4.1 **Salvage packagings (DGP/20-WP/43)**

2.6.4.1.1 Proposals were made for the amendment of Parts 4 and 6 of the Technical Instructions to align with the UN Model Regulations and to correct an inconsistency in the provisions. The current Technical Instructions requirements require salvage packagings to have a performance level applicable to the packing group of the leaking or spilled dangerous goods, whereas the UN Model Regulations require salvage packagings to meet Packing Group II requirements. It was therefore proposed to change 4;1.4.2 and 6;4.8 to align with the UN requirements.

2.6.4.1.2 It was noted that while this appeared to increase the stringency of the Technical Instructions for leaked or spilled substances in Packing Group III, it was a reduction in stringency for Packing Group I substances. It was further noted that the DGP had, in the past, made a conscious decision to require performance appropriate for the specific packing group. Other members considered that the UNSCETDG had made a measured decision and that DGP should follow it. The meeting subsequently agreed, by a small majority, to accept the proposed change.

2.6.4.2 **Packing Instruction 200 (DGP/20-WP/86)**

2.6.4.2.1 A proposal was made to align sub-paragraph 2.1 c) 3) with the corresponding UN text. Although there was no objection to the proposed change, it was mentioned that the UNSCETDG was likely to review the text in the near future, particularly with respect to the mandatory requirement to use the filling ratio formula. In view of the possibility of a significant change from the UN in the near future, it was suggested that no change should be made at present.

2.6.4.2.2 A further proposal was made not to include the UN change which introduced text to Packing Instruction 200 concerning the carriage of fluorine since this substance is forbidden for air

transport. It was suggested that the text provided useful information for exemption purposes and should be retained, but the majority of the panel favoured excluding it from the Technical Instructions. It was noted, however, that the Supplement needed to be reviewed in light of changes to Packing Instruction 200 and it might be appropriate to include the provision in the Supplement.

2.6.4.3 **Packing Instructions 131 and 133 (DGP/20-WP/85)**

2.6.4.3.1 It was proposed to alter the wording of these packing instructions to reflect the UN text more accurately. It was also noted that some of the substances quoted by UN number were forbidden for transport by air and it was suggested that they could consequently be deleted from the Technical Instructions.

2.6.4.3.2 It was agreed to amend the text as suggested. However, since the packing instructions were not repeated in the Supplement and could be needed for exemption purposes, it was agreed to retain the forbidden substance UN numbers as at present.

2.6.4.4 **Packing Instruction 602**

2.6.4.4.1 It was noted that the meeting had already agreed to add a new paragraph 4 to Packing Instruction 602 to allow small quantities of other dangerous goods to be included with infectious substances. Although this was accepted in principle, it was considered that the text might cause confusion. It was therefore proposed to amend 5;3.2.4 instead. The necessity to refer to the requirements of 1;2.4.3 and to Class 9 was questioned, but it was pointed out that the text was the same as had been included in Packing Instruction 650. The proposal was agreed.

2.6.4.5 **Packing Instruction 650**

2.6.4.5.1 It was noted that for shipments of infectious substances in both Category A and B, the telephone number of a responsible person must be provided. For Category A substances, a name and telephone number are required on the dangerous goods transport document; however, for Category B substances, Packing Instruction 650 requires the name, telephone number and address to be provided. It was suggested that a name and telephone number are sufficient and that an address is not necessary. The meeting agreed and Packing Instruction 650 was amended accordingly.

2.6.4.6 **Packing Instruction 900 (DGP/20-WP/55)**

2.6.4.6.1 A member indicated that sub-paragraph b) 2) iii) of Packing Instruction 900 was open to misinterpretation and he made proposals for clarifying it and also including an absolute pressure limit on the system.

2.6.4.6.2 The amendment was agreed with editorial changes. Surprise was expressed that pressures in these systems could be so high (i.e. 400 bar), but the meeting was assured that this was the case.

2.7 PART 5 — SHIPPER'S RESPONSIBILITIES

2.7.1 Use of the terms "surface" or "side" (DGP/20-WP/80)

2.7.1.1 A member mentioned the requirements in the Technical Instructions to attach labels to the "surface" of packages. This did not appear to be sufficiently precise since it did not make it clear that the intent of the requirements was that labels should be placed close to the proper shipping name. This would become clear if the word "side" were to be used instead of "surface". Amendments to relevant paragraphs were consequently proposed.

2.7.1.2 Some members doubted the need for such a change and it was also pointed out that the Technical Instructions text reflected UN Model Regulations. In view of these comments, the member making the proposal agreed that it would make it to the UNSCETDG in the first instance.

2.7.2 Labelling

2.7.2.1 Format of hazard labels (DGP/20-WP/65)

2.7.2.1.1 It had been noted in the past that some of the hazard labels shown in the Technical Instructions varied very slightly from those in the UN Model Regulations, as did those in the IMDG code. This had always been considered by DGP as a trivial matter having no bearing on safety. However, cases had occurred of shippers receiving fines, sometimes significant, for using labels with these minor variations. It was therefore being proposed to add a note to 5;3.4.1.2 that minor variations in the labels, which have no effect on the obvious meaning of the labels, should be acceptable.

2.7.2.1.2 Members were shocked and dismayed to hear that fines had been imposed for what they considered to be trivial reasons. It was considered that such actions could be detrimental to safety if they discouraged shippers from declaring dangerous goods and shipping them instead as non-dangerous to avoid the danger of such fines. It was noted that a member of UNSCETDG was presenting a paper to that body on this same subject and wording from that proposal was incorporated into the new note for the Technical Instructions.

2.7.2.1.3 The meeting agreed with the proposed text, with editorial amendments. It was also agreed to add similar text to 7;1.1.2 (Operators' acceptance procedures) which already has a note on the acceptability of minor variations (e.g. in punctuation) in proper shipping names etc.

2.7.2.2 Alignment with UN labels (DGP/20-WP/30)

2.7.2.2.1 Notwithstanding the discussion reported in 2.7.2.1 above, it was agreed to align the labels in the Technical Instructions with those in the UN Model Regulations. It was also agreed that the Secretary would voice support for the paper to the UNSCETDG mentioned in 2.7.2.1.2 above.

2.7.2.2.2 It was suggested that DGP should propose to the UNSCETDG that the precise colours of the labels be specified in the Model Regulations. It was noted that some States and IATA already did this. However, it was the consensus that this could lead to difficult discussions in the UN and should not be pursued.

2.7.3 **Dangerous goods transport document (DGP/20-WP/45)**

2.7.3.1 The meeting was reminded that at DGP-WG/04 and DGP-WG/05 proposals had been put forward for amendment of 5;4.1.5.1 to require the shipper to provide the net quantity of dangerous goods in each package rather than the total quantity of dangerous goods covered by the description on the dangerous goods documents. This was proposed because the current wording does not provide sufficient information for the operator to meet 7;4.1 f) with respect to information to the pilot-in-command. The current text also severely limits the operator's ability to conduct a proper acceptance check on the consignment and verify that the package quantity limitations have been observed. Based on comments received at DGP-WG/04 and DGP-WG/05, a revised text for 5;4.1.5.1 was presented for the meeting's consideration.

2.7.3.2 Members welcomed and accepted the new proposal which solved a long-standing problem. It was noted that sub-paragraphs e) and f) of 5;4.1.4.2.2 could be deleted as a result of this change, as could the same sub-paragraphs of 4.1.4.3.

2.7.3.3 It was also suggested that the UNSCETDG should be advised of this decision and requested to consider adopting similar amendments to the Model Regulations or to add an appropriate note recognizing the differences in the air mode's provisions. It was pointed out that the air mode had always had differences in this area and that it would be preferable simply to advise the sub-committee of DGP's action and make no further suggestion. This was agreed and the Secretary was asked to take the necessary action.

2.7.4 **Requirements to provide the name and telephone number of a responsible person with shipments of infectious substances (DGP/20-WP/59)**

2.7.4.1 It was pointed out that the first sentence of 5;4.1.3 was repeated in 5;4.1.5.6 which appeared to be unnecessary. Also, in 5;4.1.5.6 it was not clear if the reference to national law applied only to infectious substances or to the other controlled substances also.

2.7.4.2 Amendments to the text to rectify these two points were proposed and agreed by the meeting.

2.8 **PART 6 — PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS**

2.8.1 **Cryogenic receptacles (DGP/20-WP/48)**

2.8.1.1 It was recalled that DGP/19 had not accepted the requirements of the 13th Edition of the UN Model Regulations for closed cryogenic receptacles and pressure receptacles other than cylinders. This was because the regulations only dealt with closed cryogenic receptacles whereas the Technical Instructions already had provisions for open cryogenic receptacles also. New provisions had been developed to align with the UN Model Regulations 13th and 14th Editions and to keep provisions for open cryogenic receptacles which are needed in the air mode. These had been developed by a member in close cooperation with manufacturers and shippers of cryogenic receptacles. The proposed amendment included changes to definitions (Part 1, Chapter 3); Part 6, Chapter 5 and a new Packing Instruction 202.

2.8.1.2 The meeting commended the member concerned for the excellent work on this topic. The proposed amendments were agreed with some editorial changes.

2.8.2 **Plastic aerosols (DGP/20-WP/20)**

2.8.2.1 It was recalled that there are provisions in the UN Model Regulations, RID/ADR and the IMDG Code for the transport of plastic aerosols. This type of receptacle was developed more than twenty years ago but a number of problems meant that it had never been taken up on a large commercial scale. Recently there had been renewed commercial interest and a number of prototypes are currently being sold in North America and Japan. Companies wish to export products and need to be able to move them by air and at present this is only possible under an authority's approval. This aerosol is only being developed for use with non flammable and non toxic gases and the contents will not be a dangerous substance (mainly soaps and foodstuffs). It was therefore proposed to amend 6;3.2.8, add a new special provision and modify Packing Instruction 203 and Y203 to establish the conditions for the transport of these articles by air.

2.8.2.2 Members agreed in principle to allow plastic aerosols. The meeting examined the proposals in detail and made a number of amendments and refinements to the texts to ensure that they were consistent. With the amendments, the texts were agreed.

2.9 **PART 7 — OPERATOR'S RESPONSIBILITIES**

2.9.1 **Segregation of explosives (DGP/20-WP/23, WP/51, WP/81 and WP/89)**

2.9.1.1 It was recalled that the explosives segregation requirements of Part 7;2.2.2 had been discussed at the first working group meeting (DGP-WG/04). It had been noted that they came directly from the UN Regulations and referred to many explosives that were forbidden for transport by air. It had been agreed to consult explosives experts and to revise the requirements to eliminate references to explosives that could not be carried by air. This had now been done and the results were presented to the meeting for review, together with some further proposed refinements.

2.9.1.2 The proposals were generally accepted, except for some of the terminology in the new paragraph 2.2.2.3:

a) the meaning of the expression "not adjacent" was questioned. It was suggested that it would not be acceptable to meet the intent of the requirement by leaving an empty space or an empty pallet between the unit load devices containing the explosives;

b) the expression "non-containerised aircraft" was queried. It was suggested that this was intended to cover the case where explosives were not loaded into unit load devices; and

c) use of the word "bays" was questioned. It was thought that it was intended to refer to closed cargo compartments, but the expression was sometimes used to describe open loading areas on the upper decks of cargo aircraft, used to facilitate centre of gravity calculations but not to physically separate cargo.

2.9.1.3 A number of members had indicated difficulty with the existing paragraph 7;2.2.2.1 of the Technical Instructions. It was noted that the text came from the UN Model Regulations and was not applicable in some respects because it contained references to explosives which were forbidden for transport by air. The meeting made a detailed examination of the provisions and amended them to ensure that they reflected the other provisions of the Technical Instructions. It was noted that the ICAO text now deviated from the UN text, but this was an inevitable result of the special requirements of the aviation sector. It was also noted that the amendments would not affect the segregation table (Table 7-1).

2.9.2 **Review of the segregation table (Table 7-1)**

2.9.2.1 The meeting reviewed the provisions of Table 7-1 in respect of the segregation of Divisions 6.1 and 6.2 and Class 7 substances from other dangerous goods and also the segregation of all dangerous goods from animals and foodstuffs.

2.9.2.2 Concerning Divisions 6.1 and 6.2 and Class 7, it was noted that no reports of problems had been received from States. Moreover, for there to be the risk of a reaction between two dangerous goods not segregated in accordance with Table 7-1, there would have to be a failure of the integrity of the two adjacent packages. No one was aware of such an event and it was concluded that the provisions of Table 7-1 were adequate.

2.9.2.3 Concerning segregation from foodstuffs, it was noted that packages containing the latter were not always easy to identify and it was considered that the provisions of 7;2.8 were also adequate. The current provisions of 7;2.9.6.3 were considered to provide enough information for separating live animals from radioactive materials.

2.9.2.4 In light of the foregoing, the meeting agreed that no changes to the Technical Instructions were necessary. The meeting further reviewed segregation charts of the IMDG and two operators. The IMDG charts were deemed to be overly complex for aviation use. It was also noted that nothing prevented an operator from constructing more restrictive segregation charts than those in the Technical Instructions. The meeting was also of the opinion that for a number of reasons the probability of an interaction between two non-compatible dangerous goods during air transport had diminished significantly thanks to the application of the Technical Instructions provisions.

2.9.3 **Dry ice contained in a ULD (DGP/20-WP/62 and WP/90)**

2.9.3.1 The meeting discussed three aspects of this topic as reported in the following paragraphs:

2.9.3.2 **Loading of a ULD**

2.9.3.2.1 The meeting discussed the requirements applicable to shippers when preparing ULDs with dry ice, how the operator should be consulted during this process and what the operator's responsibilities during acceptance and transport would be. It was subsequently agreed that:

a) the text of Part 5;1.1 i), which describes what dangerous goods a shipper may load into a unit load device, should be modified to include reference to all three applicable Packing Instructions, i.e. Packing Instruction 902, 904 and 910;

b) the text of Special Provision A151 (as shown in DGP/20-WP/6) should be modified by amending "properly identified" in the second sentence to read "identified to the operator";

c) Packing Instruction 904 should be modified to separate the requirements for dry ice in packages and dry ice when contained in a shipper loaded unit. This includes modification of the text agreed at DGP WG/04 (as shown in DGP/20-WP/7) by deleting the second sentence of the new text and amending the last sentence to read "The shipper must advise the operator of the quantity of dry ice in each unit load device or other type of pallet.";

d) Part 7;1.1.1 c) should be amended to include "… prepared according to Packing Instruction 904". It was also noted that "other type of pallet" in 7;1.1.1 c) included an environmental container; and

e) additional text should be added into 7;2.11 to identify that if additional dry ice is added by the operator then the information to the pilot-in-command must reflect the new mass of dry ice in the ULD.

2.9.3.3 **Indication on the ULD tag of Dangerous Goods**

2.9.3.3.1 The discussion on this issue centred around the method by which the operator may "visibly indicate" the class(es) and/or division(s) of dangerous goods contained in a ULD. The text in the Technical Instructions has been in place, with only minor amendment, since the first edition of the Technical Instructions in 1984. A great number of operators have, during this period, been using the IATA Cargo IMP Codes as a method of visibly indicating the class/division. However, of recently a number of authorities have challenged the use of the IMP Codes and required that the class/division be shown by the class/division number.

2.9.3.3.2 There was some discussion on which groups of persons needed to be able to read and apply the information provided on the ULD tag. It was believed that an important category of personnel for whom this information was of use was emergency responders and that this group would be unaware of the meaning of the IMP Codes. For this reason it was decided that the text of Part 7;2.7.2 should be amended to specifically require the class/division number.

2.9.3.4 **Indication of a subsidiary risk on the ULD Tag**

2.9.3.4.1 It was agreed that the current text of 7;2.7 was not absolutely clear that the subsidiary risk of dangerous goods had to be shown on the ULD tag. It was therefore agreed that the text should be modified to explicitly state that any subsidiary must be identified.

2.9.4 **Information to passengers (DGP/20-WP/21 and WP/44)**

2.9.4.1 It was recalled that the subject of information to passengers (7;5.1) had been addressed at DGP-WG/04. It had been agreed to rectify an error which required an airport operator to provide information to passengers about dangerous goods with the passenger ticket. However, there had been no agreement on a proposal to require operators to provide such information to passengers prior to check in.

2.9.4.2 It was suggested that the provision of information to a passenger is of far more benefit if it is received before the passenger arrives at the airport. However, it was accepted that to "provide" information may be impractical for an operator, particularly when, increasingly, the operator will not be involved in the selling of the ticket and may therefore have no contact with the passenger prior to the check in process. It was suggested that as an alternative to providing information with a ticket a more realistic approach may be to require an operator to make information "available" prior to check-in. This would ensure that passengers would be able to contact the operator and obtain appropriate information, by way of web sites, phone centres etc. Additionally, the reference to "handling agent" in 5.1.2 was queried, since this term is not used anywhere else in Part 7 where "operator" is stated; the ability of a handling agent to act on behalf of an operator is addressed in the "introductory Notes" on page 7-(i). This would also appear to subject handling agents to the provisions of 5.1.2 b). Revised text to address these problems was presented.

2.9.4.3 The meeting agreed with most of the proposals with some editorial amendment. However, there was considerable discussion as to whether the reference to a handling agent should be retained. The same issue was raised in relation to 7;4.7. Some members were of the opinion that there was no need to mention handling agents since these would be under contract to operators and the operators would be responsible for their activities. The majority of members, however, felt it useful to retain the reference in view of the widespread use of such agents by operators, especially in foreign countries.

2.9.4.4 It was noted that in Part 8 of the Technical Instructions travel agents were also mentioned and it was suggested that the subject of agents in general was one that should be addressed in the future.

2.10 PART 8 — PROVISIONS CONCERNING PASSENGERS AND CREW

2.10.1 Interpretation of "on their person"(DGP/20-WP/41)

2.10.1.1 It was noted that 8;1.1.1 contained provisions concerning dangerous goods not to be carried by passengers or crew either as carry-on baggage, checked baggage or on their person. This latter expression had caused difficulties of interpretation. Some authorities interpreted "on their person" as meaning not in carry-on baggage and it was considered that this was a very conservative interpretation. It was considered that a practical interpretation would include in clothing, even if removed and placed in an overhead compartment, and in carry-on baggage.

2.10.1.2 Some members agreed with this view, but many members were of the view that the concessions in respect of articles which passengers were allowed to carry on their person were not extended to those articles (e.g. matches, lighters) if they were placed, for example, in an overhead compartment or a coat closet. Furthermore, the practice of removing carry-on baggage from passengers and placing it in the hold, for reasons of cabin space availability, had previously been mentioned at the meeting.

2.10.1.3 In light of these discussions, the proposal was withdrawn.

2.10.2 **Dry ice transported by passengers or crew (DGP/20-WP/42)**

2.10.2.1 Attention was drawn to 8;1.1.2 f) which allows passengers and crew to transport not more than 2 kg of dry ice as a refrigerant for other non-dangerous goods in carry-on and checked baggage under certain conditions. It was suggested that a number of difficulties had arisen with this provision:

a) the packages did not need to be identified as containing dry ice which, among other things, did not allow the operator to take account of ventilation concerns;

b) there was uncertainty whether the intention was to allow 2 kg of dry ice per passenger as carry-on baggage and 2 kg as checked baggage or to allow only one of these options; and

c) in one State the corresponding limit was 5 lb of dry ice and the lower mass of 2 kg would cause considerable hardship if implemented. An increase to 2.5 kg was therefore proposed.

2.10.2.2 In general, the view was expressed that this was not a major issue in view of the fact that the use of dry ice in this context was not very common. It was not therefore perceived by several members as being a safety issue.

2.10.2.3 Concerning a) above, some members considered that a marking requirement would be difficult to enforce for carry-on baggage. On the other hand, such shipments were usually commercially prepared and if purveyors of the perishable goods with dry ice were aware of the requirement, they would doubtless apply the necessary markings. It was also mentioned that some operators themselves provided markings or tags for passengers who were shipping such packages. A majority of members agreed to add a marking requirement.

2.10.2.4 Concerning item b), it was pointed out that the present text allowed 2 kg of dry ice as carryon baggage *or* checked baggage, and not both. Some members saw no difficulty in changing the present text to allow both, but the majority were in favour of retaining the present arrangements.

2.10.2.5 Concerning item c), the meeting agreed to increase the permitted quantity to 2.5 kg.

2.10.3 **Safety matches (DGP/20-WP/22)**

2.10.3.1 It was recalled that at DGP-WG/05 it had been agreed to change “book of safety matches” in 8;1.1.2 g) to “packet of safety matches” as being a more general text. This was agreed.

2.10.4 **Avalanche rescue backpacks (DGP/20-WP/54)**

2.10.4.1 Attention was drawn to 8;1.1.2 p) which contained an error in specifying the permitted amount of compressed gas as 250 mg instead of 250 mL. This was corrected.

2.10.5 **Miscellaneous proposals concerning passengers and crew (DGP/20-WP/56)**

2.10.5.1 Attention was drawn to four miscellaneous aspects concerning dangerous goods and passengers and crew. These are dealt with individually in the following paragraphs.

2.10.5.2 It was suggested that the present text of 8;1.1.2 g) could be interpreted as allowing liquefied gas lighters in checked and carry-on baggage. The proposal to restrict "lighters" to "cigarette lighters" was noted. It was explained that other types of much larger lighters than was intended by this concession were sometimes carried on board. Several amendments to the proposed text were agreed to improve its clarity and it was accepted by the meeting.

2.10.5.3 The meeting agreed to request ICAO to publish provisions of the Technical Instructions relating to passengers on a public-access website in order that these provisions have the greatest possible exposure.

2.10.5.4 It was recalled that the subject of alcohol consumption and unruly passengers had been discussed. It was acknowledged that unruly passengers were not part of the DGP's responsibility. Particularly, it was suggested that the Note in the Technical Instructions stating that alcoholic beverages with an alcohol content of less than 24 % by volume were not restricted might conflict with the national laws and could be misinterpreted. It was considered that this was a complex issue largely covered by national laws and it was agreed that DGP should not pursue it.

2.10.5.5 Attention was drawn to at least one operator which routinely refers passengers to a dangerous goods notice during check in and specifically asks passengers whether they are carrying any non-permitted dangerous goods. A comprehensive leaflet is also provided. It was therefore suggested that this potentially useful practice should be included in the Technical Instructions — with the status of a recommendation — in 7;5.2.2. There was some concern that this might lengthen an already long check-in procedure, but the proposal was agreed.

2.11 FUEL CELLS

2.11.1 At its meeting held in April 2005, the DGP Working Group of the Whole discussed various fuel cell system technologies under development for purposes of powering consumer electronic devices, as well as the ongoing development of an International Electrotechnical Commission (IEC) standard governing the safety of such systems and the cartridges used to supply fuel to the systems. In addition, in light of the adoption by the UNSCETDG of a new entry for "**Fuel cell cartridges** containing flammable liquids" (UN 3473), the Working Group had agreed to include this entry into the Technical Instructions along with an appropriate packing instruction.

2.11.2 The Working Group had also considered the proposed incorporation into Part 8;1.1.2 of a provision allowing passengers and crew to carry small fuel cell systems fueled by flammable liquids (in particular methanol), and spare fuel cartridges for such systems. While a number of members supported this proposal, others suggested that it would be premature to adopt such a provision at that time and no final decision was taken. However, a number of useful comments and suggestions were offered by the working group in relation to the passenger exception under consideration, as well as the IEC standard that was proposed for incorporation into that exception, and it was agreed to return to this matter at DGP/20.

2.11.3 The meeting reviewed further proposals (DGP/20-WP/14, 35 and 77) for the text of 8;1.1.2, based on the working group discussions and expanding on the types of fuel which were likely to be used, which were:

methanol
formic acid
butane
borohydrides
hydrogen in metal hydride

2.11.4 Members appreciated that a new technology was involved and, although none of the devices appeared to be on the market yet, they might soon be and there was understandable desire to remove any obstacle to their unrestricted use and transport worldwide. However, members were conscious that their primary responsibility was to ensure safety in air transport and they agreed that it was essential to proceed with caution. At least one member was concerned with DGP action at this time in view of the newness of the technology.

2.11.5 The meeting had considerable difficulty in deciding how it should proceed to resolve this matter on a logical basis. After considerable discussion, members agreed that no fuel could be accepted for a passenger exception if the substance was not already acceptable in the Technical Instructions for transport as cargo on a passenger aircraft. Some members were of the opinion that they would not legally be able to justify the carriage by a passenger, in the cabin, of a substance that was not allowed in the cargo hold.

2.11.6 Members also agreed that IEC standard PAS 62282-6-1 Edition 1 (as yet undated) could be used as one of the criteria for determining the acceptability of a fuel cell or cartridge.

2.11.7 Based upon the criterion described in 2.11.5 above, the majority of members agreed that fuel cells and cartridges containing methanol or formic acid could be accepted in a passenger exception. Butane was not acceptable as such as cargo on a passenger aircraft; however, it was acceptable under UN2037 — **Gas cartridges**, (flammable) and therefore could also be accepted for the passenger exception, with appropriate quantity limitations. There was, moreover, already a precedent for butane in 8;1.1.2 k) in regard to hair curlers.

2.11.8 In the case of hydrogen in metal hydrides and borohydrides, the meeting considered that it did not have sufficient knowledge or information to be able to accept these substances as fuels at present. It was noted that there was no specific entry for borohydrides in the dangerous goods list. They could perhaps be carried under one of the generic entries, but many different forms of the compound exist, which would complicate classification. One member considered that the principle of only allowing dangerous goods already allowed as cargo on passenger aircraft (see 2.11.5 above) as one of the screening criteria would need to be revisited in the future, since it had repercussions in the case of lithium batteries.

2.11.9 It was mentioned that, although it might sometimes be possible to move fuel cartridges by other modes of transport, it was very likely that there would also be a demand to transport them by air. For this purpose, specific UN numbers and packing instructions for the cartridges would be needed. It was noted that a number had already been allocated covering methanol cartridges (see 2.11.1 above). The panel recommended that the UNSCETDG should be requested by industry to allocate numbers for the other fuels, or a generic fuel cell number might be obtained.

2.11.10 Bearing the foregoing in mind, the meeting discussed the proposed passenger exception in detail. Each of the conditions which should be met for the exception is described separately below.

2.11.11 The specific fuels which are permitted were specified. A member suggested it would be preferable to use a more generic description of which fuels were acceptable. This would help to avoid the need to change this paragraph if new fuels were added in the future. In view of the difficulties experienced at this meeting in deciding which specific fuels to allow, the majority of members preferred that the Technical Instructions should be specific on which fuels were allowed.

2.11.12 It was agreed that fuel cartridges would have to comply with provisions of the IEC standard PAS 62282-6-1, Edition 1. One member expressed concern about the drop test requirements for devices. He was assured that the required 1.2 m drop onto a hardwood floor was at least as severe as a 1.8 m drop onto a typical aircraft cabin floor. It was noted that although this standard has been adopted by the IEC, it is not expected to be published until early in 2006. The Secretary was requested to consult the ICAO Legal Bureau on the propriety of including reference to a specification which technically did not yet exist. It was also agreed that the Secretary would monitor the publication of the standard and consult the panel if any delay seemed likely. It was noted that if for any reason the IEC standards were not published or were to be substantially changed, the provisions could not be included in the 2007/2008 edition of the Technical Instructions.

2.11.13 It was agreed that it must not be possible for users to refill fuel cartridges on-board aircraft. This did not mean that cartridges could not be refillable by manufacturers if they wished to design them accordingly. It was also agreed to specify that refilling of fuel cell systems on board an aircraft would not be permitted, except by installing a spare fuel cartridge. Furthermore, fuel cell cartridges used to refill systems, but not to remain installed, would not be permitted.

2.11.14 It was proposed that the quantity limit for liquid fuels should be 200 ml. However, it was noted that Packing Instruction 203 imposed a limit of 120 ml for butane in plastic gas cartridges and 200 ml in metal cartridges. It was agreed to maintain the 200 ml limit for liquids and metal cartridges of liquefied gas (butane) and to restrict plastic cartridges of liquefied gas to 120 ml to maintain alignment with PI 203.

2.11.15 It was agreed that each fuel cartridge and each fuel cell system must be marked with a manufacturer’s certification that it meets IEC PAS 62282-6-1 Edition 1. It was also suggested that the cartridge should be marked with the type and quantity of fuel it contained, but it was noted that this was already required by IEC PAS 62282-6-1 in the case of fuel cell systems. It was also suggested that cartridges should be marked to indicate that they were only permitted in passengers’ carry-on baggage. However, it was pointed out that there was no such marking requirement for other passenger exception items (e.g. matches) and it was therefore agreed not to require it in this case. However, see discussion detailed under 2.11.19.

2.11.16 The number of spare cartridges that a passenger should be allowed to carry was discussed. It was suggested that two or three spare cartridges should be allowed for each fuel cell system, but it was pointed out that some passengers might be carrying several pieces of equipment powered by fuel cells and that consequently this could add up to significant number of spare cartridges. It was therefore suggested that a limited total number of cartridges per passenger should be permitted. Another view was that only spare cartridges sufficient to cover the flight time were justified, which would probably mean no more than one spare per device. It was also suggested that the word “spare” might be

deleted, thus in effect limiting the total number of cartridges. It was eventually agreed to impose a limit of two spare cartridges per passenger. Also on the subject of cartridges, the problem that airlines would face in disposing of empty cartridges left on board the aircraft — which would still technically be dangerous goods — was raised.

2.11.17 A specific condition was included to make it clear that fuel cell systems and cartridges were permitted as carry-on baggage only.

2.11.18 A new requirement was introduced to the effect that the interaction between fuel cells and integrated batteries in a device must conform with the IEC standard. Moreover, fuel cell systems whose sole function was to charge a battery in a device would not be permitted. It was questioned how a person checking in passengers would know whether a fuel cell system met these requirements. It was pointed out, however, that this was the passenger's responsibility and there were many other requirements that the checker could not verify.

2.11.19 A further new requirement was added indicating that fuel cell systems must be of a type that would not continue to charge batteries when the device being powered was not in use. It was further agreed that the fuel cell system must be marked to indicate that they met this requirement. It was agreed that the manufacturer should be responsible for this marking. The text of the marking was discussed at length and it was mentioned that there would be a language issue if only a text in English were to be specified. It was eventually agreed that the marking should say "Approved for carriage in aircraft cabin only." It was noted that, as written the new provisions would allow the use of any language for the marking that a State might choose. It was therefore agreed to add a further provision, similar to that already existing in 5;2.5 of the Technical Instructions which recommends the use of English in addition to the State's chosen language.

2.11.20 It was noted (DGP/20-WP/72) that a new Packing Instruction 313 had been added for fuel cells which requires strong outer packagings. This reflects the corresponding UN Model Regulations requirement. However, there were a number of similar items in the dangerous goods list — mainly batteries of various types — for which the UN regulations required UN specification packaging. For consistency and in view of the new technology involved, it was suggested that UN specification packagings should be required in Packing Instruction 313 also. The majority of members agreed with this more conservative approach.

2.12 VARIATIONS

2.12.1 International telephone access codes (DGP/20-WP/66)

2.12.1.1 It was recalled that this subject had been discussed already at DGP-WG/04. It arose because, in their State variations reproduced in the Technical Instructions, many States required shippers to provide an emergency response telephone number including an international access code. This caused considerable difficulties for shippers because these codes were often different in different States (for the same telephone number) and they would sometimes have to quote the same telephone number several times on the same shipment, each time with a different access code. Moreover, it was often difficult for a shipper to find out what the codes were.

2.12.1.2 To alleviate this problem, it was proposed that the meeting should request the Secretary either to:

a) request States not to require a shipper to include the access code; or

b) standardize the presentation by removing any requirement for access codes from State variations.

2.12.1.3 It was agreed that option b) would be improper and it was consequently withdrawn. Many members agreed that these codes were a problem for shippers, but others, while sympathetic, considered this to be an issue of national sovereignty in which the DGP should not become involved. The large majority of members, however, agreed that the Secretary should be requested to take the matter up with States.

2.12.2 **Advice from the ICAO Legal Bureau**

2.12.2.1 Advice had been sought from the ICAO Legal Bureau regarding:

a) the status of State Variations;

b) the responsibilities of States with regard to notifying ICAO of operator variations; and

c) the status of differences.

2.12.2.2 In response the Legal Bureau advised the meeting as follows:

a) State variations per se are not part of the Technical Instructions which are approved by the Council of ICAO, but notifications by States which are published by ICAO, as per paragraph 2.5.1 of Annex 18. This is similar to differences from the Standard and Recommendation Practices (SARPs) which are published in Annexes in the form of Supplements in accordance with Article 38 of the Chicago Convention. As to the effect of the notification of such variations, it should be understood that, in any case, pursuant to Article 11 of the Convention, any Contracting State is entitled to establish laws and regulations applicable to international air navigation through its airspace, provided that such laws and regulations are non-discriminatory and not inconsistent with the terms of the Convention. This provision reflects the principle of sovereignty enshrined in Article 1 of the Convention. Accordingly, even if a State notified a variation *vis-à-vis* a Technical Instruction, its operators will have to comply with such Technical Instruction as fully implemented in any State which would not have notified such a variation. For other material in attachments to the Technical Instructions, it is noted that Attachment 3, Chapter 1 does not specify anything about the status of its contents, while Attachment 3, Chapter 2 specifies that material therein is for information purposes only, alike Supplements to Technical Instructions (see Foreword). Also, attachments to Annexes of the Convention constitute guidance material and are not granted the status of SARPs. It would be useful to specify on the cover page of Attachment 3 to the Technical Instructions what is the status of its

contents, particularly if there was any intent to grant them a status different from guidance or information material.

b) Paragraph 2.5.2 of Annex 18, which is a Recommended Practice, clearly provides that more restrictive requirements adopted by operators should be notified to ICAO as variations for publication in the Technical Instructions. The fact that such variations might originate from compliance with IATA documents has no impact on the scope of applicability of such a Recommended Practice which remains unaffected. On the other hand, paragraph 2.5.2 provides that States should "ensure" that such notification is made, i.e. they could avoid doing it themselves, for instance by tasking operators to do so directly.

c) Concerning the status of differences from SARPs *vis-à-vis* variation from the Technical Instructions, as stated above, variations are not differences in the meaning of Article 38 of the Convention as they constitute national requirements varying from Technical Instructions, not from SARPs adopted under the Article 90 procedure. It must be noted that, pursuant to Articles 37 and 38, a Standard in an Annex has a conditional binding force, i.e. is legally binding to the extent that the State concerned has not duly notified any difference thereto.

2.12.2.3 The meeting noted this advice with interest. It was clear that the list of variations published in the Technical Instructions could be considered as a "bulleting board" for the convenience of other States, shippers and operators. One member indicated that some States routinely incorporated each new edition of the Technical Instructions on bloc into their regulations and that for those States the lists of variations might have a different status, at least internally.

2.13 RELATIONS WITH THE UNITED NATIONS SUB-COMMITTEE OF EXPERTS ON THE TRANSPORT OF DANGEROUS GOODS (UNSCETDG)

2.13.1 Submission to next UNSCETDG meeting (DGP/20-IP/9)

2.13.1.1 The Secretary presented for the meeting's review a working paper to be presented by ICAO to the 28th Session of the UNSCETDG later in 2005. This paper contained proposals for changes to the UN Model Regulations which DGP had developed since the last session of the committee.

2.13.1.2 Attention was focussed on the proposal to amend paragraph 2.6.3.2.3.6 of the Model Regulations (concerning the packaging of human or animal specimens for which there is minimal likelihood that pathogens are present) to make the provisions mandatory (i.e. to replace the word "should" by "shall" in a number of places). It was noted that although DGP had made the provisions mandatory in the Technical Instructions, it had not been the intention to suggest they should be mandatory for all modes. This was agreed and it was also agreed that the UNSCETDG should instead be asked to add a note to their provisions indicating the air mode's differences.

2.13.1.3 It was also noted that this meeting still had to discuss changes to PI 602 which would probably lead to a need to ask the UNSCETDG to amend its regulations. The Secretary noted that a new

submission to the sub-committee would be required, but that the deadline for papers had already passed. Efforts would nevertheless be made to have all the DGP's concerns addressed at the 28th Session.

2.13.2 **Development of UN provisions on excepted quantities (DGP/20-WP/69)**

2.13.2.1 The meeting was advised that a working paper on the subject of excepted quantities of dangerous goods had been presented by a member of the UNSCETDG to that body's meeting in July 2005. This recommended the inclusion of provisions in the Model Regulations on this subject similar in principle to the provisions of the Technical Instructions. This proposal had met with a mixed reception. Some members of the sub-committee were in favour of adding multi-modal provisions to the Model Regulations; others would have duplicated the text from the Technical Instructions and one member did not see the need for such provisions.

2.13.2.2 No conclusion had been reached, and a new paper had now been prepared for presentation at the December 2005 meeting of UNSCETD. This paper was presented to DGP/20 for its review so that the DGP's views could be presented to UNSCETD by the Secretary. It was noted that the new text was much closer to the Technical Instructions than was the case in the previous submission.

2.13.2.3 Members had reviewed the proposals but had been hampered because they could not easily identify precisely what differences there were between the new proposals and the Technical Instructions. It was agreed that a detailed comparison would be produced but in any case it would be valuable for DGP to advise the UNSCETDG, through the Secretary, that it strongly supported the development of intermodal provisions on this subject and that it had been a very successful concept in aviation. One member reiterated that, notwithstanding the good safety record, his organization had misgivings about excepted and limited quantity provisions. He considered that, whatever the UNSCETDG might decide, the provisions of the Technical Instructions should not be made less stringent. This point was echoed by other speakers. Furthermore, the UNSCETDG should be advised that it would be highly desirable to have Model Regulations broadly based on the Technical Instructions. Although some differences could be accepted, weakening the stringency of the Technical Instructions provisions would not be acceptable.

2.13.3 **Global harmonization of dangerous goods provisions (DGP/20-WP/27)**

2.13.3.1 The meeting was informed of a paper presented to the July meeting of the UNSCETDG, and discussed informally by that body, on the subject of enhancing global harmonization between the UN Model Regulations for the transport of dangerous goods and the provisions of other international and modal provisions. It was proposed that DGP should make its views on this subject known to the UNSCETD at its next meeting in December 2005. A number of possible areas where harmonization could be improved were detailed in the UNSCETD paper and the Secretary provided other detailed suggestions.

2.13.3.2 The meeting agreed that this was an effort which should definitely be supported by ICAO. However, it was not considered feasible to look into it in detail at this meeting and it was agreed that it should be included as a non-recurrent work programme item for the DGP during the next biennium.

2.13.3.3 It was noted that one topic discussed by the UNSCETDG was the possibility of developing a multimodal world convention on the transport of dangerous goods and that ICAO had

already responded negatively to this idea at UNSCETDG. Some members reiterated their opposition to such a convention. The present systems gave States the degree of flexibility they needed and, moreover, development of a convention would be a long and costly endeavour which would divert resources away from other essential tasks. The meeting generally agreed with this view, but it considered it would be better to indicate ICAO's support for harmonizing the detailed regulations and its intention to pursue the matter actively as part of its work programme during the next biennium. The Secretary was requested to advise the UNSCETDG of DGP's views.

2.13.4 **Use of notes in texts other than the Technical Instructions**

2.13.4.1 The meeting reviewed informal comments received from the secretary of the UNECE Secretariat concerning the status of notes in the UN Model Regulations and other texts. It noted that, as is not the case in the Technical Instructions, such Notes are considered to contain mandatory requirements.

2.14 RECOMMENDATION

2.14.1 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*

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

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APPENDIX A

GUIDANCE DOCUMENT

Infectious Substances
International Civil Aviation Organization Technical Instructions for the Safe Transport of Dangerous Goods by Air, 2005-2006

Note: This guidance document is only valid for the period of 1 January 2005 through 31 December 2006.

Introduction

The 2005/2006 edition of the ICAO Technical Instructions and its Addenda (Doc 9284-AN/905 dated 18/3/05 and 30/6/05) reflect amendments made to the Infectious Substances requirements published in the 13th revised edition of the UN Model Regulations and certain requirements in the 14th revised edition. These requirements were developed in coordination with experts from the World Health Organization (WHO) and other technical experts in the field of transport, packaging and health.

The purpose of this document is to provide guidance for complying with the 2005/2006 ICAO Technical Instructions. Specifically the document provides guidance on:

- Definitions
- Classification
- Exceptions
- Packaging for Exempt Patient Specimens
- Packaging Provisions for Infectious Substances, affecting humans or animals, UN 2814 or UN 2900
- Packaging Provisions for Clinical Specimens, Diagnostic Specimens, Biological Substances, Category B, UN 3373
- Prohibitions
- Passenger Provisions
- Training and Emergency Response

Definitions

Infectious substances are substances which are known to contain, or are reasonably expected to contain, pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

Cultures are the result of a process by which pathogens are intentionally propagated. This definition does not include human or animal patient specimens.

Medical or clinical wastes are wastes derived from the medical treatment of animals or humans or from bio-research

Patient specimens are those collected directly from humans or animals, including, but not limited to, excreta, secreta, blood and its components, tissue and tissue fluid swabs, and body parts being transported for purposes such as research, diagnosis, investigational activities, disease treatment and prevention.

Classification

For transport purposes the classification of infectious substances by risk groups was removed from the ICAO Technical Instructions in the 2005/ 2006 edition.

Infectious substances are now classified as Category A or Category B.

There is no direct relationship between Risk Groups and Category A and B.

Category A Infectious Substances are infectious substances in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. They are assigned the following proper shipping name and UN number:

- **Infectious Substance affecting humans**, UN 2814 or
- **Infectious Substance affecting animals** *only*, UN 2900.

Assignments to UN 2814 or UN 2900 are to be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal. If there is any doubt as to whether or not a pathogen falls within this category it must be transported as a Category A Infectious Substance.

Clinical wastes containing Category A Infectious Substances must be assigned to UN 2814 or 2900, as appropriate.

To assist in the assignment of an infectious substance into Category A see the Indicative List provided in Table 2-10 in the 2005/2006 ICAO Technical Instructions and as amended in the Addendum to the ICAO Technical Instructions dated 18/3/05. That list is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria must be assigned to Category A.

Category B Infectious Substances are Infectious Substances that do not meet the criteria for inclusion in Category A. They are assigned the following proper shipping names and UN number UN 3373:

- **Biological Substance, Category B**,
- **Diagnostic Specimen***, or
- **Clinical Specimen***.

**From January 1, 2007 the shipping names 'Diagnostic Specimens' and 'Clinical Specimens' will no longer be permitted.*

Clinical wastes containing Category B infectious substances must be assigned to UN 3291.

Further assistance on the classification of infectious substances can be obtained from the national health or veterinary authority. (See Annex 1 for Classification Scenarios and Annex 2 for a Classification Flowchart.)

Exceptions

- Substances, which do not contain infectious substances, or substances, which are unlikely to cause disease in humans or animals, are not subject to the ICAO Technical Instructions unless they meet the criteria for inclusion in another class.

- Substances containing microorganisms which are non-pathogenic to humans or animals are not subject to the ICAO Technical Instructions unless they meet the criteria for inclusion in another class.

- Substances in a form that any present pathogens have been neutralized or inactivated such that they no longer pose a health risk are not subject to the ICAO Technical Instructions unless they meet the criteria for inclusion in another class.

- Environmental samples (including food and water samples) which are not considered to pose a significant risk of infection are not subject to the ICAO Technical Instructions unless they meet the criteria for inclusion in another class.

- Dried blood spots, collected by applying a drop of blood onto absorbent material, or faecal occult blood screening tests and blood or blood components which have been collected for the purposes of transfusion or for the preparation of blood products to be used for transfusion or transplantation and any tissues or organs intended for use in transplantation are not subject to the ICAO Technical Instructions.

- Patient specimens for which there is minimal likelihood that pathogens are present are not subject to the ICAO Technical Instructions if the specimen is transported in Packaging for Exempt Patient Specimens (**See below for the Packaging requirements for Exempt Patient Specimens**.)

  Note: In determining whether a patient specimen has a minimal likelihood that pathogens are present, an element of professional judgement is required. That judgement should be based on the known medical history, symptoms and individual circumstances of the source, human or animal, and endemic local conditions. Examples of specimens which may be transported as a patient specimen for which there is a minimal likelihood that pathogens are present include blood or urine tests to monitor cholesterol levels, blood glucose levels, hormone levels, or prostate specific antibodies (PSA); tests required to monitor organ function such as heart, liver or kidney function for humans or animals with non-infectious diseases, or therapeutic drug monitoring; tests conducted for insurance or employment purposes and are intended to determine the presence of drugs or alcohol; pregnancy tests; biopsies to detect cancer; and antibody detection in humans or animals.

Packaging for Exempt Patient Specimens

Patient specimens (human or animal) that have a minimal likelihood of containing pathogens must be packaged appropriately to further minimize the risk of exposure. While these specimens have a minimal likelihood of containing infectious pathogens in a form that would cause infection, appropriate packaging further minimizes the risk of exposure. Effective with the publication of Addendum No. 2, dated 30/6/05, the 2005-2006 ICAO Technical Instructions require exempt human or animal specimens to be packaged and marked according to the following:

(i) a leak-proof primary receptacle(s);
(ii) a leak-proof secondary packaging; and
(iii) an outer packaging of adequate strength for its capacity, mass and intended use, and with at least one surface having minimum dimensions of 100 mm × 100 mm;

For liquids, absorbent material in sufficient quantity to absorb the entire contents must be placed between the primary receptacle(s) and the secondary packaging so that, during transport, any release or leak of a liquid substance will not reach the outer packaging and will not compromise the integrity of the cushioning material;

When multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent contact between them.

If such a packaging is used it must be marked "Exempt human specimen" or "Exempt animal specimen", as appropriate.
(*See Annex 3 for a graphic depiction of an Exempt Patient Specimen Packaging*)

If other dangerous goods are present with patient specimens the relevant provisions of the ICAO Technical Instructions apply to those goods.

When dangerous goods intended for air transport are carried by surface transport to or from an airport, any other applicable national or modal transport requirements should be met in addition to those that are applicable for the goods when carried by air.

Packaging Provisions for Infectious Substances, humans or animals, UN 2814 or UN 2900

Packing Instruction 602 in the 2005/2006 ICAO Technical Instructions specifies the type of packaging required for all Category A Infectious Substances. All other applicable provisions of the ICAO Technical Instructions apply (See Annex 4 for a graphic depiction of a Category A package).

Packaging Provisions for Clinical Specimens, Diagnostic Specimens, Biological Substances, Category B, UN 3373

Packing Instruction 650 in the 2005/2006 ICAO Technical Instructions and as amended in the Addendum, dated 18/3/05, provides all the information necessary to prepare and transport Category B Infectious Substances. No other provisions of the ICAO Technical Instructions apply. (See Annex 5 for a graphic depiction of a Category B package).

Prohibitions

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 animals may only be transported under terms and conditions approved by the appropriate national authority.

Passenger Provisions

Category A or B Infectious Substances are not permitted for transport in carry-on or checked baggage and must not be carried on a person. Exempted human or animal specimens may be carried in carry-on or checked baggage provided they meet the appropriate packaging requirements.

Training and Emergency Response

Effective employee training and appropriate emergency response procedures are required to significantly minimize the risk of exposure and subsequent transmission of infection or disease.

Mitigation procedure:

DO NOT CLEAN-UP OR DISPOSE OF INFECTIOUS SUBSTANCES, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

- Isolate spill or leak area immediately.
- Keep unauthorized personnel away.
- Obtain identity of substance involved if possible and report the spill to the appropriate authorities.
- Do not touch or walk through spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Be particularly careful to avoid contact with broken glass or sharp objects that may cause cuts or abrasions that could significantly increase the risk of exposure.
- Damaged packages containing solid CO2 as a refrigerant may produce water or frost from condensation of air. Do not touch this liquid as it could be contaminated by the contents of the parcel.
- Liquid nitrogen may be present and can cause severe burns.
- Absorb spilled materials with earth, sand or other non-combustible material while avoiding direct contact.
- Cover damaged package or spilled material with damp towel or rag and keep wet with liquid bleach or other disinfectant. Liquid bleach will generally effectively inactivate the released substance.

First Aid:

- Move exposed person(s) to a safe isolated area.

CAUTION: Exposed person(s) may be a source of contamination. Persons administering first aid should take precautions to avoid personal exposure or secondary contamination of others.

- Call emergency medical services.

- If clothing and/or shoes are significantly contaminated, remove and isolate them. However, do not allow this to delay other first aid interventions.
- In case of contact of the substance to skin, eyes, nose or mouth, immediately flush the exposed area with copious amounts of running water. Continue this until emergency medical services arrives. Follow their advice for further decontamination.
- Most effects of exposure (inhalation, ingestion or skin contact) to substance are likely to be delayed.
- Ensure that medical personnel are aware of the substances involved so they can take precautions to protect themselves.

For further assistance, contact the appropriate public health authority

ANNEX 1 - Classification Scenarios

1. A blood sample known or reasonably suspected to contain EBOLA VIRUS.

Appropriate classification: Infectious Substances, affecting humans UN 2814.

2. A culture of FOOT AND MOUTH DISEASE.

Appropriate classification: Infectious Substances, affecting animals, UN 2900.

3. A blood sample taken from a patient known or suspected to have a Category B pathogen, such as HEPATITIS B or HIV.

Appropriate classification: Biological Substances, Category B*, UN 3373.

4. Culture of BOVINE TUBERCULOSIS.

Appropriate classification: Biological Substances, Category B*, UN 3373.

5. Laboratory stock culture of a pathogen in Category B, e.g. INFLUENZA VIRUS.

Appropriate classification: Biological Substances, Category B*, UN 3373.

6. Specimen containing a Category A or B infectious substance, treated so as to inactivate or neutralise the pathogens such that they no longer pose a health risk.

Appropriate classification: Not subject to the transport requirements for dangerous goods, unless meeting the criteria for another class or division.

7. Patient specimens other than those known or reasonably suspected to contain a Category A infectious substance e.g. those sent for testing for Cholesterol (blood), diabetes (urine), bowel cancer (faecal).

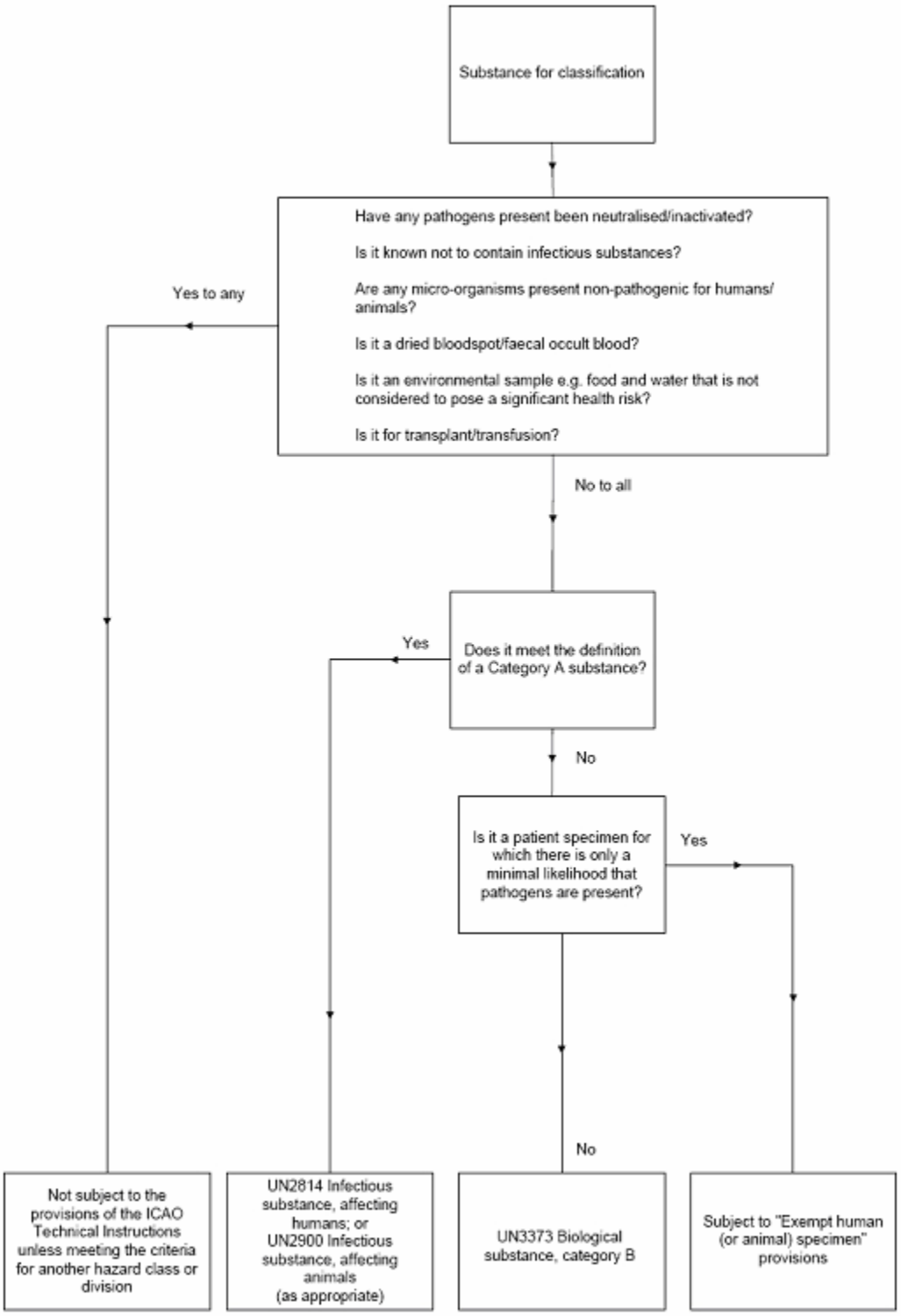
Appropriate classification: this will depend on professional judgement ie:

(i) If a professional judgement is made that there is only a minimal likelihood that pathogens are present, the specimen is not subject to the provisions of the ICAO Technical Instructions, providing they are packed in accordance with the provisions detailed under “Packaging for Exempt Patient Specimens” in this Guidance Document;

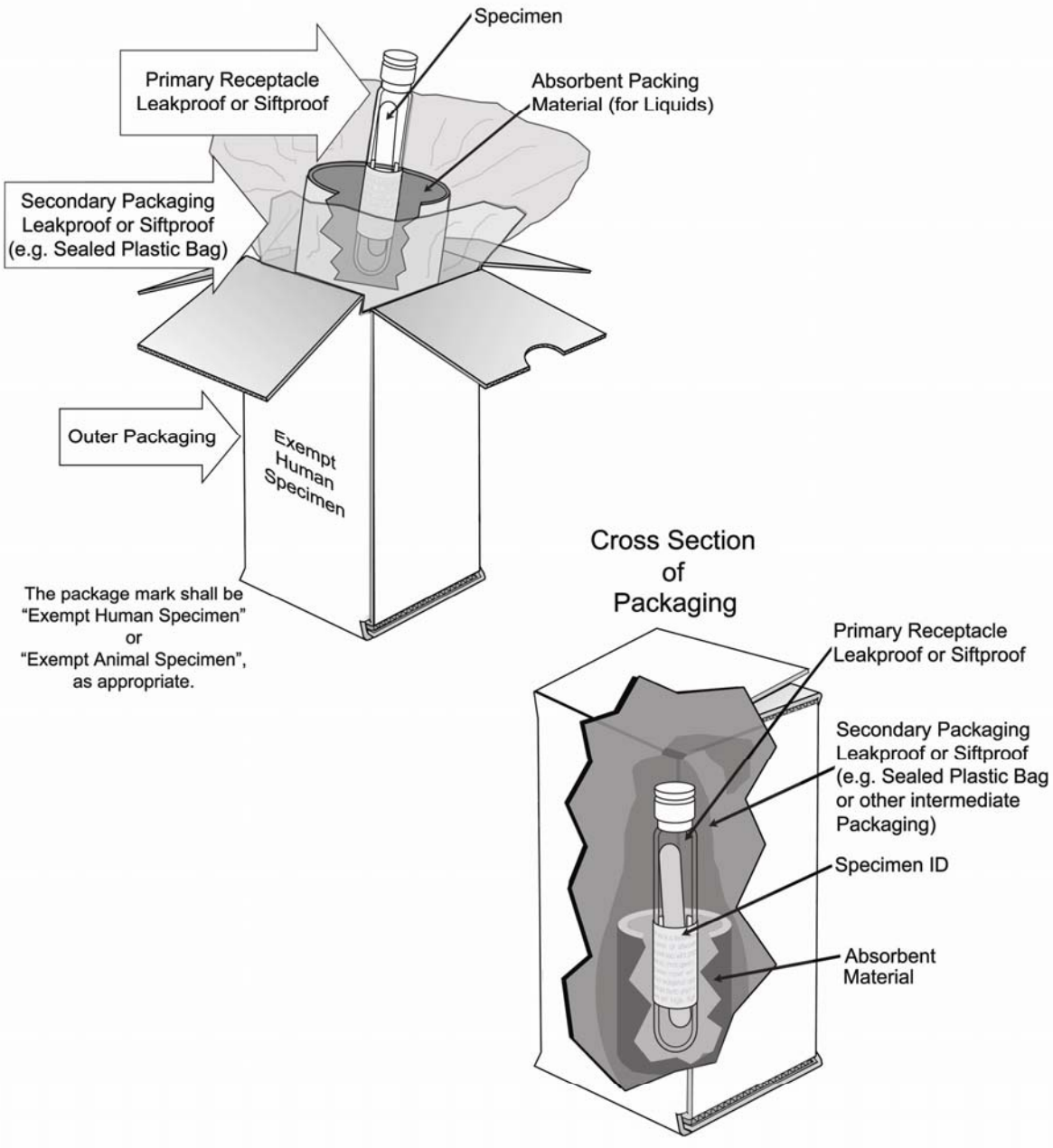
(ii) If no professional judgement is made, the specimen must be classified as UN3373.

** The shipping names ‘Diagnostic Specimens’ or ‘Clinical Specimens’ may be used until December 31, 2006.*

ANNEX 2 – Classification Flowchart



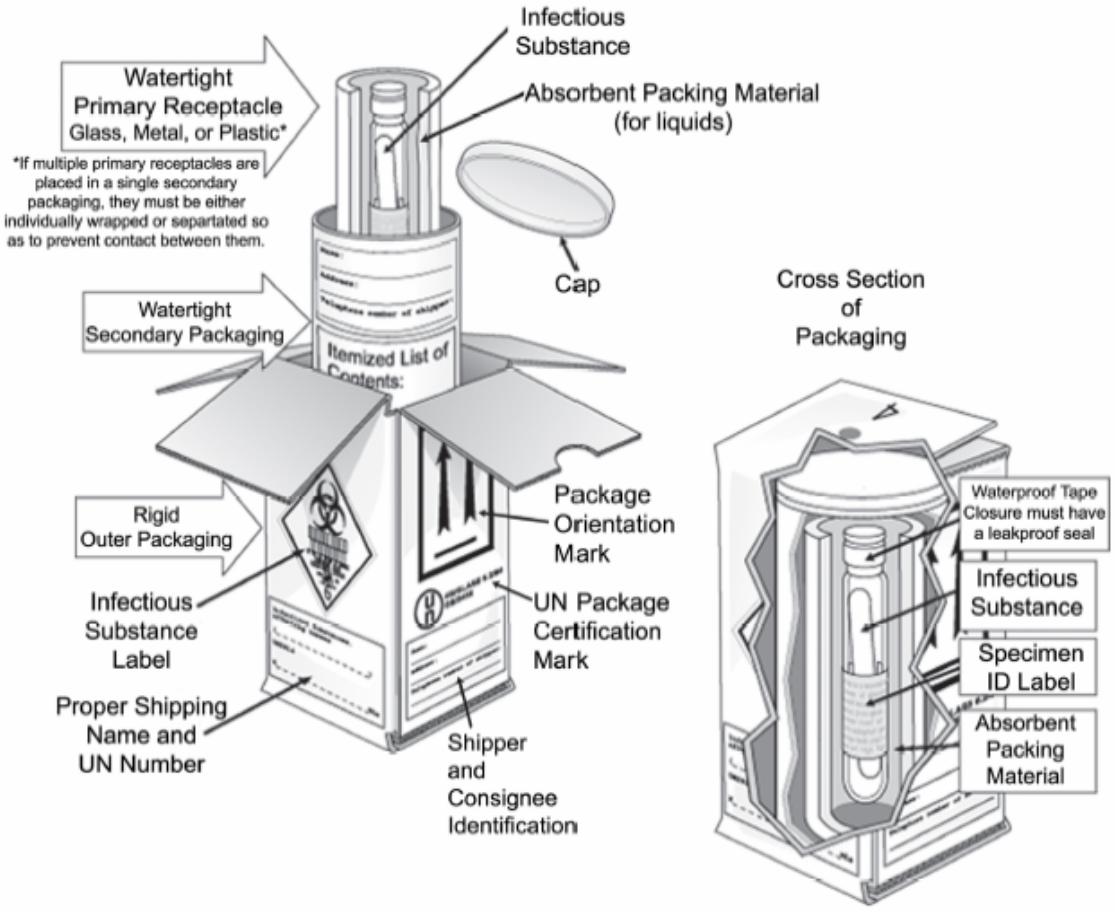
ANNEX 3
Example of Packing and Marking for Exempt Human Specimens or Exempt Animal Specimens



ANNEX 4

Packing, Marking and Labelling of Catagory A Infectious Substances

(See Packing Instruction 602)



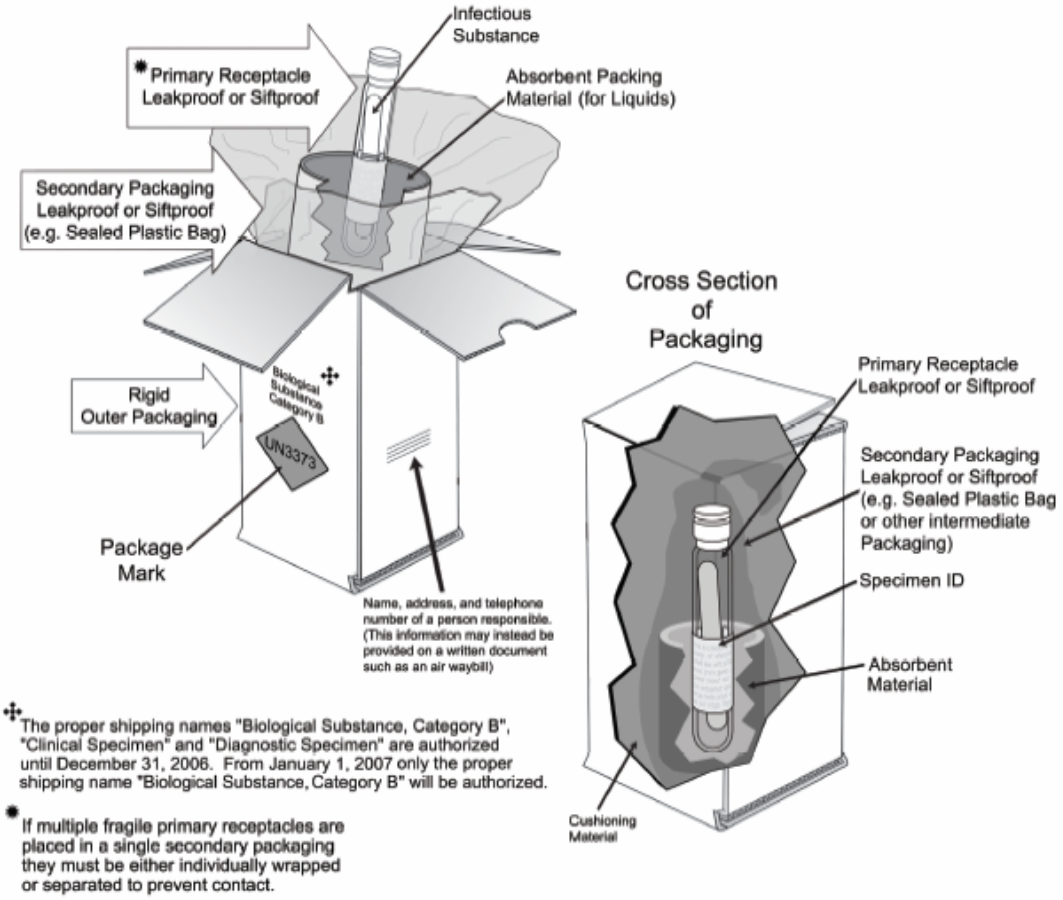
Note: 1-The smallest externat dimension of the outer packaging must not be less than 100 mm

Note: 2-The primary receptacle or the secondary packaging must be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 KPa

ANNEX 5

Example of Packing and Marking for Catagory B Infectious Substances

(See Packing Instruction 650 for additional requirements; e.g. pressure differential and drop test)



✣ The proper shipping names "Biological Substance, Category B", "Clinical Specimen" and "Diagnostic Specimen" are authorized until December 31, 2006. From January 1, 2007 only the proper shipping name "Biological Substance, Category B" will be authorized.

✸ If multiple fragile primary receptacles are placed in a single secondary packaging they must be either individually wrapped or separated to prevent contact.

Note: 1-At least one surface of the outer packaging must have a minimum dimension of 100 mm X 100 mm

Note: 2-The primary receptacle or the secondary packaging must be capable of withstanding without leakage an internal pressure producing a pressure differential of not less than 95 KPa

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APPENDIX B

PROPOSED AMENDMENTS TO THE TECHNICAL INSTRUCTIONS

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. An addendum to this edition of the ICAO *Technical Instructions for the Safe Transport of Dangerous Goods by Air* issued by ICAO is part of these Instructions.

. . .

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:

a) placed on board with the approval of the operator to provide, during flight, medical aid to a patient providing:

1) gas cylinders have been manufactured specifically for the purpose of containing and transporting that particular gas:

2) equipment containing wet cell batteries is kept and, when necessary secured, in an upright position to prevent spillage of the electrolyte;

Note.— For dangerous goods that passengers are permitted to carry as medical aid, see 8;1.1.2.

b) to provide, during flight, veterinary aid or a humane killer for an animal;

c) for dropping in connection with agricultural, horticultural, forestry or pollution control activities;

d) to provide, during flight, aid in connection with search and rescue operations;

e) vehicles carried in aircraft designed or modified for vehicle ferry operations and all of the following requirements are met:

1) authorization has been given by the appropriate authorities of the States concerned, and such authorities have prescribed specific terms and conditions for the particular operator's operation;

2) vehicles are secured in an upright position;

3) fuel tanks are so filled as to prevent spillage of fuel during loading, unloading and transit; and

4) adequate ventilation rates are maintained in the aircraft compartment in which the vehicle is carried.

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).

1.1.3.2 Provision must be made to stow and secure dangerous goods transported under 1.1.3.1 a), b), c) and d) during take-off and landing and at all other times when deemed necessary by the pilot-in-command.

1.1.3.3 The dangerous goods must be under the control of trained personnel during the time when they are in use on the aircraft.

1.1.3.4 Dangerous goods transported under 1.1.3.1 a), b), c) and d) may be carried on a flight made by the same aircraft before or after a flight for the purposes identified above, when it is impracticable to load or unload the dangerous goods immediately before or after the flight, subject to the following conditions:

i) the dangerous goods must be capable of withstanding the normal conditions of air transport;

ii) the dangerous goods must be appropriately identified (e.g. by marking or labelling)

iii) the dangerous goods may only be carried with the approval of the operator;

iv) the dangerous goods must be inspected for damage or leakage prior to loading;

v) loading must be supervised by the operator;

vi) the dangerous goods must be stowed and secured in the aircraft in a manner that will prevent any movement in flight which would change their orientation;

vii) the pilot-in-command must be notified of the dangerous goods loaded onboard the aircraft and their loading location. In the event of a crew change, this information must be passed to the next crew;

(viii) all personnel must be trained commensurate with their responsibilities;

(ix) the provisions of 7;4.2 and 7;4.4 apply.

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1.3 DANGEROUS GOODS PACKAGES OPENED BY CUSTOMS AND OTHER AUTHORITIES

Any package opened during an inspection must, before being forwarded to the consignee, be restored by qualified persons to ~~its original~~ a condition which complies with these Instructions ~~by qualified persons~~.

1.4 TRANSPORT OF RADIOACTIVE MATERIAL

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1.4.2 Radiation protection programme

1.4.2.1 The transport of radioactive material must be subject to a radiation protection programme, which must consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

1.4.2.2 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 1.4.2.3 to 1.4.2.5, 7;2.9.1.1; 7;2.9.1.2, 7;1.6.1.3 and applicable emergency response procedures. Programme documents must be available, on request, for inspection by the relevant competent authority.

1.4.2.3 Doses to persons must be below the relevant dose limits. Protection and safety must be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure must be kept as low as reasonably achievable, economic and social factors being taken into account, ~~and doses to persons must be below the relevant dose limits~~ within the restriction that the doses to individuals be subject to dose constraints. A structured and systematic approach must be adopted and must include consideration of the interfaces between transport and other activities.

1.4.2.4 Workers must receive appropriate training concerning ~~the radiation hazards involved and~~ radiation protection including the precautions to be observed in order ~~to ensure restriction of their exposure and that~~ to restrict their occupational exposure and the exposure of other persons who might be affected by their actions.

1.4.2.5 For occupational exposures arising from transport activities, where it is assessed that the effective dose:

~~a) is most unlikely to exceed 1 mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping must be required;~~

~~b~~a) is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring must be conducted; and

~~c~~d) is likely to exceed 6 mSv in a year, individual monitoring must be conducted.

When individual monitoring or workplace monitoring is conducted, appropriate records must be kept.

Note.— For occupational exposures arising from transport activities, where it is assessed that the effective dose is most unlikely to exceed 1 mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping need be required.

. . .

1.4.4 Special arrangement

1.4.4.1 Special arrangement ~~must~~ means those provisions, approved by the competent authority, under which consignments of radioactive material that do not satisfy all the applicable requirements of these Instructions ~~applicable to radioactive material~~ may be transported.

1.4.4.2 Consignments for which conformity with any provision applicable to Class 7 is impracticable must not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the Class 7 provisions of these Instructions is impracticable and that the requisite standards of safety established by these Instructions have been demonstrated through alternative means, the competent authority may approve special arrangement transport operations for a single consignment or a planned series of multiple consignments. The overall level of safety in transport must be at least equivalent to that which would be provided if all the applicable requirements had been met. For ~~international~~ consignments of this type, multilateral approval must be required.

1.4.5 Non-compliance

. . .

d) the communication of the non-compliance to the shipper and relevant competent authority(ies), respectively, must be made as soon as practicable and it must be immediate whenever an emergency exposure situation has developed or is developing.

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Chapter 2
LIMITATION OF DANGEROUS GOODS ON AIRCRAFT

. . .

2.3 DANGEROUS GOODS IN AIRMAIL

2.3.1 In accordance with the Universal Postal Union (UPU) Convention, dangerous goods as defined in these Instructions, with the exception of those listed below, are not permitted in the mail.

National postal authorities should ensure that the provisions of the UPU Convention are complied with in relation to the transport of dangerous goods by air.

2.3.2 The following dangerous goods may be acceptable in mail for air carriage subject to the provisions of the national postal authorities concerned and these Instructions which relate to such material~~, except that the provisions concerning documentation (Part 5, Chapter 4) do not apply to the radioactive material described in b) below~~:

a) patient specimens as defined in 2;6.3.1.4 provided that they are classified, packed and marked as required by 2;6.3.2.3.6;

b) infectious substances assigned to category B (UN 3373) only, when packed in accordance with the requirements of Packing Instruction 650, and solid carbon dioxide (dry ice) when used as a refrigerant for ~~infectious substances~~ UN 3373; and

~~b~~c) radioactive material, the activity of which does not exceed one-tenth of that listed in Table 2-~~11~~12.

. . .

2.4 DANGEROUS GOODS IN EXCEPTED QUANTITIES

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2.4.2 Applicability

2.4.2.1 Excepted quantities of dangerous goods may only be carried in accordance with the limitations and provisions contained in this paragraph and must meet all the applicable requirements of those parts of the Technical Instructions listed in 2.4.1 above.

2.4.2.2 Only dangerous goods which are permitted on passenger aircraft and which meet the criteria of the following classes, divisions and packing groups (if appropriate) may be carried under these provisions for dangerous goods in excepted quantities:

Division 2.2	Without subsidiary risk
Class 3	All packing groups
Class 4	Packing Groups II and III but excluding all self-reactive substances
Division 5.1	Packing Groups II and III
Division 5.2	Only when contained in a chemical kit or a first-aid kit
Division 6.1	All substances other than those having an inhalation toxicity of Packing Group I
Class 8	Packing Groups II and III but excluding UN Nos. 2803 and 2809

Class 9	All substances and articles other than magnetized material and carbon dioxide, solid.

. . .

2.4.4 Packing requirements

Packagings, including their closures, used for the transport of dangerous goods in excepted quantities must be of good quality. Packaging materials which may come into contact with the substance or article must not react dangerously with the substance or article and must not adversely affect its packaging functions. In addition:

a) each inner packaging must be constructed of plastic having a minimum thickness of not less than 0.2 mm, or of glass, earthenware or metal. The materials of inner packagings must not contain substances which may react dangerously with the contents, form hazardous products or significantly weaken the packagings. The closure of each inner packaging with a removable closure must be held securely in place with wire, tape or other positive means. Any receptacle having a neck with moulded screw threads must have a leakproof threaded type cap completely resistant to the contents. Except for temperature sensing devices, inner packagings must not completely fill with liquid when at a temperature of 55°C. Gases must be packed in appropriate receptacles;

b) each inner packaging or gas receptacle must be securely packed in an intermediate packaging with cushioning material. The intermediate packaging must completely contain the contents in case of breakage or leakage, regardless of package orientation. For liquid dangerous goods, the intermediate packaging must contain sufficient absorbent material to absorb the entire contents of the inner packaging. In such cases, the absorbent material may be the cushioning material. Dangerous goods must not react dangerously with cushioning and absorbent material or adversely affect their properties;

. . .

f) when different dangerous goods are contained in one outer packaging, the quantities of different dangerous goods contained in one outer packaging must be calculated using the formula:

$$\frac{n_1}{M1} + \frac{n_2}{M_2} + \frac{n_3}{M_3} + \ldots \frac{n_x}{M_x} \leq 1$$

where n_1, n_2, etc., are the net quantities of the different dangerous goods contained in the same outer packaging and M_1, M_2, etc., are the maximum net quantities permitted for the appropriate packing group by 2.4.3 b). However, the following dangerous goods do not need to be taken into account in the calculation:

~~1) carbon dioxide, solid (dry ice), UN 1845;~~

~~2)~~ those with the same UN number, packing group and physical state (i.e. solid or liquid), provided they are the only dangerous goods in the package and the total net quantity does not exceed the maximum net quantity according to 2.4.3 b);

. . .

2.4.6 Marking and certification

2.4.6.1 Each package prepared according to these provisions must be durably and legibly marked with the words "Dangerous goods in excepted quantities" and with the name and address of the shipper. For radioactive material in excepted packages marked and labeled in accordance with 5;2.4.5 a) and e) and 5;3.2.11 e), the words "Dangerous goods in excepted quantities" are not required. If the package is included in an overpack, these markings must be clearly visible or appear on the overpack.

. . .

Chapter 3
GENERAL INFORMATION

3.1 DEFINITIONS

3.1.1 The following is a list of definitions of commonly used terms in these Instructions. Definitions of terms which have their usual dictionary meanings or are used in the common technical sense are not included. Definitions of additional terms used solely in conjunction with radioactive material are contained in 2;7.2.

. . .

Approval. An authorization issued 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, 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.

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

Bags. Flexible packagings made of paper, plastic film, textiles, woven material or other suitable materials.

. . .

Cargo. *Any property carried on an aircraft other than mail, stores and accompanied or mishandled baggage.*

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

. . .

Critical temperature. *The temperature above which the substance cannot exist in the liquid state.*

Cryogenic receptacle. *A transportable thermally insulated receptacle for refrigerated liquefied gases, of a water capacity of not more than 1000 litres.*

. . .

Drums. Flat-ended or convex-ended cylindrical packagings made of metal, fibreboard, plastic, plywood or other suitable materials. This definition also includes packagings of other shapes, e.g. round taper-necked packagings, or pail-shaped packagings. Jerricans are not covered by this definition.

Elevated temperature substance. A substance which is transported or offered for transport:

— in the liquid state at a temperature at or above 100°C;

— in the liquid state with a flashpoint above ~~60.5~~60°C and which is intentionally heated to a temperature above its flashpoint; or

— in a solid state and at a temperature at or above 240°C.

***EN** (standard)*. A European standard published by the European Committee for Standardization (CEN) (CEN - 36 rue de Stassart, B-1050 Brussels, Belgium).

Exception. A provision in these Instructions which excludes a specific item of dangerous goods from the requirements normally applicable to that item.

. . .

Gross mass. The total mass of the package.

IAEA. The International Atomic Energy Agency (IAEA, P.O. Box 100 — A-1400 Vienna, Austria).

ID number. A temporary identification number for entries in Table 3-1 — Dangerous Goods List — which have not been assigned a UN number.

IEC. The International Electrotechnical Commission (IEC, 3, rue de Varembé, P.O. Box 131, CH - 1211 Geneva 20, Switzerland)

IMO. The International Maritime Organization (IMO, 4 Albert Embankment, London SE1 7SR, United Kingdom).

Incompatible. Describing dangerous goods which, if mixed, would be liable to cause a dangerous evolution of heat or gas or produce a corrosive substance.

. . .

International System of Units (SI). A rational and coherent system of units which provides the basis for the units of measurement used for air and ground operations as contained in Annex 5 to the Convention on International Civil Aviation.

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

Jerricans. Metal or plastic packagings of rectangular or polygonal cross-section.

. . .

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/140).

Mail. Dispatches of correspondence and other items tendered by and intended for delivery to postal services in accordance with the rules of the Universal Postal Union (UPU).

Manual of Tests and Criteria. The fourth 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).

. . .

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.

. . .

State of the Operator. The State in which the operator has his principal place of business or, if he has no such place of business, his permanent residence.

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.*

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. 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.

. . .

UN number. The four-digit number assigned by the United Nations Committee of Experts on the Transport of Dangerous Goods to identify a substance or a particular group of substances.

UNECE. The United Nations Economic Commission for Europe (UNECE, Palais des Nations, 8-14 avenue de la Paix, CH-1211 Geneva 10, Switzerland).

Working pressure. The settled pressure of a compressed gas at a reference temperature of 15°C in a full pressure receptacle.

. . .

Chapter 4
TRAINING

4.1 ESTABLISHMENT OF TRAINING PROGRAMMES

4.1.1 Initial and recurrent dangerous goods training programmes must be established and maintained by or on behalf of:

a) shippers of dangerous goods, including packers and persons or organizations undertaking the responsibilities of the shipper;

b) operators;

c) ground handling agencies which perform, on behalf of the operator, the act of accepting, handling, loading, unloading, transferring or other processing of cargo, mail or stores;

d) ground handling agencies located at an airport which perform, on behalf of the operator, the act of processing passengers;

e) agencies, not located at an airport, which perform, on behalf of the operator, the act of checking in passengers;

f) freight forwarders; and

g) agencies engaged in the security screening of passengers and their baggage and/or cargo, mail or stores.

. . .

4.2 TRAINING CURRICULA

4.2.1 Personnel must receive training 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.

4.2.3 Recurrent training must take place within 24 months of previous training to ensure knowledge is current.

4.2.4 A test to verify understanding must be undertaken following training. ~~and a certificate issued confirming.~~ 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) ~~a copy of the certification issued when the individual was trained,~~ evidence which shows that a test has been completed satisfactorily.

The records of training must be made available upon request to the appropriate national authority.

4.2.6 The subject matter relating to dangerous goods transport with which various categories of personnel should be familiar is indicated in Table 1-4.

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Table 1-4. Content of training courses

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KEY

1 — Shippers and persons undertaking the responsibilities of shippers
2 — Packers
3 — Staff of freight forwarders involved in processing dangerous goods
4 — Staff of freight forwarders involved in processing cargo, mail or stores (other than dangerous goods)
5 — Staff of freight forwarders involved in the handling, storage and loading of cargo, mail or stores
6 — Operator's and ground handling agent's staff accepting dangerous goods
7 — Operator's and ground handling agent's staff accepting cargo, mail or stores (other than dangerous goods)
8 — Operator's and ground handling agent's staff responsible for the handling, storage and loading of cargo, mail or stores and baggage
9 — Passenger-handling staff
10 — Flight crew members and load planners
11 — Crew members (other than flight crew members)
12 — Security staff who deal with the screening of passengers and their baggage and cargo, mail or stores

. . .

4.3 Instructor Qualifications

4.3.1 Unless otherwise provided for by the appropriate national authority, instructors of initial and recurrent dangerous goods training programmes must have adequate instructional skills and have successfully completed a dangerous goods training programme in the applicable category or Category 6, prior to delivering such a dangerous goods training programme.

4.3.2 Instructors delivering initial and recurrent dangerous goods training programmes must at least every 24 months deliver such a course, or in the absence of this attend recurrent training.

Chapter 5
DANGEROUS GOODS SECURITY

. . .

Table 1-5. Indicative list of high consequence dangerous goods

Class 1 Division 1.1 explosives
Class 1 Division 1.2 explosives
Class 1 Division 1.3 compatability group C explosives
Division 2.3 toxic gases (excluding aerosols)
Division 6.1 substances of Packing Group 1; except when transported under the excepted quantity provisions in 2.4
Division 6.2 infectious substances of Category A (UN Nos. 2814 and 2900)
Class 7 radioactive materials in quantities greater than 3000 A_1 (special form) or 3000 A_2, as applicable in Type B and Type C packages.

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 and of IAEA INFCIRC/225 (Rev.4) are applied.

Part 2

CLASSIFICATION OF DANGEROUS GOODS

INTRODUCTORY CHAPTER

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2. Classes, divisions, packing groups — definitions

. . .

2.2 Many of the substances assigned to Classes 1 to 9 are deemed, without additional labelling, as being environmentally hazardous.

2.3 Wastes ~~shall~~ must be transported under the requirements of the appropriate class considering their hazards and the criteria in these Instructions. ~~2.3~~ Wastes not otherwise subject to these Instructions but covered under the Basel Convention, may be transported under Class 9.

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Chapter 1
CLASS 1 — EXPLOSIVES

. . .

1.5 CLASSIFICATION OF EXPLOSIVES

Note. — For additional information regarding classification of explosives, see UN Recommendations, 2.1.3.1.4, 2.1.3.1.5 and 2.1.3.4.

1.5.1.1 Any substance or article having or suspected of having explosive characteristics must be considered for classification in Class 1 in accordance with the tests, procedures and criteria prescribed in Part I of the *UN Manual of Tests and Criteria*. Substances and articles classified in Class 1 must be assigned to the appropriate division and compatibility group in accordance with the procedures and criteria prescribed in that document.

1.5.1.2 The classification of fireworks must be based on paragraph 2.1.3.5 of the UN Recommendations.

Editorial Note.— Renumber subsequent paragraphs accordingly.

. . .

Chapter 2
CLASS 2 — GASES

. . .

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.

Note.— UN 1950 Aerosols, UN 2037 Receptacles, small, containing gas and UN 2037 Gas cartridges must be regarded as being in Division 2.1 when the criteria in 2.5.1a) are met.

a) Division 2.1 — Flammable gases.

Gases which at 20°C and a standard pressure of 101.3 kPa:

i) are ignitable when in a mixture of 13 per cent or less by volume with air; or

ii) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO Standard 10156/1996). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority must be used.

*Note.— **Aerosols** (UN 1950) and UN 2037 **Receptacles, small, containing gas** must be regarded as being in Division 2.1 when the criteria in 2.5.2 are met.*

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

Gases which ~~are transported at a pressure not less than 280 kPa at 20°C, or as refrigerated liquefied gases, and 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; or

iii) do not come under the other divisions.

c) Division 2.3 — Toxic gases.

Gases which:

i) are known to be so toxic or corrosive to humans as to pose a hazard to health; or

ii) are presumed to be toxic or corrosive to humans because they have an LC_{50} value equal to or less than 5 000 mL/m^3 (ppm) when tested in accordance with 6.2.1.3.

Note.— Gases meeting the above criteria owing to their corrosivity are to be classified as toxic with a subsidiary corrosive risk.

2.2.2 Gases of Division 2.2, other than refrigerated liquefied gases, are not subject to these Instructions if they are transported at a pressure less than 280 kPa at 20 °C.

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Chapter 3
CLASS 3 — FLAMMABLE LIQUIDS

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3.1 DEFINITION AND GENERAL PROVISIONS

3.1.1 Class 3 includes the following substances:

a) Flammable liquids (see 3.1.2 and 3.1.3);

b) Liquid desensitized explosives (see 3.1.4).

3.1.2 Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example paints, varnishes, lacquers, etc., but not including substances otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than ~~60.5°C~~60°C, closed-cup test, or not more than 65.6°C, open-cup test, normally referred to as the flash point. This class also includes:

a) liquids offered for transport at temperatures at or above their flash point; and

b) substances that are transported or offered for transport at elevated temperatures in a liquid state and which give off a flammable vapour at a temperature at or below the maximum transport temperature (i.e. the maximum temperature likely to be encountered by the substance in transport).

Note.— Since the results of open-cup tests and of closed-cup tests are not strictly comparable and even individual results by the same test are often variable, regulations varying from the above figures to make allowance for such differences would be within the spirit of this definition.

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Table 2-4. Packing group based on flammability

Packing group	*Flash point (closed-cup)*	*Initial boiling point*
I	—	≤35°C
II	<23°C	>35°C
III	≥23°C, ≤~~60.5°C~~60°C	>35°C

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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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4.2.3 Division 4.1 — Self-reactive substances

4.2.3.1 *Definitions and properties*

4.2.3.1.1 Definitions

For the purposes of these Instructions:

a) Self-reactive substances are thermally unstable sub-stances liable to undergo a strongly exothermic decomposition even without the participation of oxygen (air). The following substances must not be considered to be self-reactive substances of Division 4.1 if:

i) they are explosives according to the criteria of Class 1;

ii) they are oxidizing substances according to the ~~assignment procedure in 5.2.1.1~~ classification procedure for Division 5.1 (see 5.2.1.1) except that mixtures of oxidizing substances which contain 5.0 percent or more of combustible organic substances must be subjected to the classification procedure defined in Note 3;

iii) they are organic peroxides according to the criteria of Division 5.2;

iv) their heat of decomposition is less than 300 J/g; or

v) their self-accelerating decomposition temperature is greater than 75°C for a 50 kg package.

Note~~.~~ 1.— The heat of decomposition can be determined by using any internationally recognized method, e.g. differential scanning calorimetry and adiabatic calorimetry.

Note~~.~~ 2.— Any substance which shows the properties of a self-reactive substance must be classified as such, even if this substance gives a positive test result, according to 4.3.2 for inclusion in Division 4.2.

Note 3.— Mixtures of oxidizing substances meeting the criteria of Division 5.1 which contain 5.0 percent or more of combustible organic substances, which do not meet the criteria mentioned in (i), (iii), (iv) or (v) above, must be subjected to the self-reactive substance classification procedure.

A mixture showing the properties of a self-reactive substance, type B to F, must be classified as a self-reactive substance of Division 4.1.

A mixture showing the properties of a self-reactive substance, type G, according to the principle of 2.4.2.3.3.2 (g) of the UN Recommendations must be considered for classification as a substance of Division 5.1 (see 5.2.1.1).

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4.2.3.2.4 List of currently assigned self-reactive substances in packages

The following table (Table 2-6) is reproduced from 2.4.2.3.2.4 in the *UN Recommendations on the Transport of Dangerous Goods* (~~Thirteenth~~ Fourteenth revised edition), with irrelevant material removed.

. . .

Table 2-6. List of currently assigned self reactive substances in packages

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

Self-reactive substance	*Concentration (%)*	*Control temperature (°C)*	*Emergency temperature (°C)*	*UN generic entry*	*Notes*
Acetone-pyrogallol copolymer 2-diazo-1-naphthol-5-sulphonate	100			3228	

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Chapter 5
CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

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5.2 OXIDIZING SUBSTANCES (DIVISION 5.1)

5.2.1 Classification in Division 5.1

5.2.1.1 Oxidizing substances are classified in Division 5.1 in accordance with the test methods, ~~and~~ procedures and criteria in 5.2.2, 5.2.3 and ~~in~~ the *Manual of Tests and Criteria,* Part III, section 34. In the event of divergence between test results and known experience, the appropriate authority of the State of Origin must be consulted to establish the appropriate classification and packing group.

Note.— Where substances of this division are listed in the Dangerous Goods List in Chapter 3.2, reclassification of those substances in accordance with these criteria need only be undertaken when this is necessary for safety.

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5.3.2.4 *List of currently assigned organic peroxides*

The following table (Table 2-7) is reproduced from 2.5.3.2.4 of the UN *Recommendations on the Transport of Dangerous Goods* (~~Eleventh~~ Fourteenth revised edition), with irrelevant material removed.

. . .

5.3.2.6 Samples of new formulations of organic peroxides not listed in 5.3.2.4 for which complete test data are not available and which are to be transported for further testing or evaluation may be assigned to one of the appropriate entries for **Organic peroxide Type C** provided that the following conditions are met:

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Chapter 6
CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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Table 2-8. Grouping criteria for administration through oral ingestion, dermal contact and inhalation of dusts and mists

Packing group	*Oral toxicity* LD_{50} *(mg/kg)*	*Dermal toxicity* LD_{50} *(mg/kg)*	*Inhalation toxicity by dusts and mists* LC_{50} *(mg/L)*
I	~~≤5~~	~~≤40~~	~~≤0.5~~
II	~~>5, ≤50~~	~~>40, ≤200~~	~~>0.5, ≤2~~
III	~~solids: >50, ≤200 liquids: >50, ≤500~~	~~>200, ≤1 000~~	~~>2, ≤10~~
I	≤ 5.0	≤ 50	≤ 0.2
II	> 5.0 and ≤ 50	> 50 and ≤ 200	> 0.2 and ≤ 2.0
III[a]	>50 and ≤300	> 200 and ≤ 1000	> 2.0 and ≤ 4.0

~~Note.~~ [a] *Tear gas substances must be included in Packing Group II even if their ~~having~~ toxicity data ~~corresponding~~ correspond to Packing Group III values ~~are nevertheless included in Packing Group II~~.*

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6.3 DIVISION 6.2 — INFECTIOUS SUBSTANCES

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6.3.2 Classification of infectious substances

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6.3.2.2.2 *Category B:* An infectious substance which does not meet the criteria for inclusion in Category A. Infectious substances in Category B must be assigned to UN 3373.

Note.— The proper shipping name of UN 3373 is ~~***Diagnostic specimens*** *or* ***Clinical specimens***~~ *or* ***Biological substances, Category B***. ~~*From 1 January 2007, the use of the shipping names* ***Diagnostic specimens*** *and* ***Clinical specimens*** *will no longer be permitted.*~~

6.3.2.3 ~~*Exemptions*~~*Exceptions*

6.3.2.3.1 Substances which do not contain infectious substances or substances which are unlikely to cause disease in humans or animals are not subject to these Instructions unless they meet the criteria for inclusion in another class.

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Chapter 7
CLASS 7 — RADIOACTIVE MATERIAL

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7.1 DEFINITION OF CLASS 7

7.1.1 Radioactive material means any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in 7.7.2.1 to 7.7.2.6.

7.1.2 The following radioactive materials are not included in Class 7 for the purposes of these Instructions:

a) radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;

b) radioactive material in consumer products which have received regulatory approval, following their sale to the end user;

c) natural material and ores containing naturally occurring radionuclides which are either in their natural state or have only been processed for purposes other than for extraction of the radionuclides, and are not intended to be processed for use of these radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in ~~7.7.2~~ 7.7.2.1 b), or calculated in accordance with 7.7.2.2 to 7.7.2.6.

d) non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit specified in the definition of contamination in 7.2.

7.2 DEFINITIONS

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Approval:

Multilateral approval. The approval by the relevant competent authority ~~both~~ of the country of origin of the design or shipment, as applicable and also, where ~~and of each country through or into which~~ 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.

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Freight container in the case of radioactive material transport. An article of transport equipment designed to facilitate the transport of packaged goods, by one or more modes of transport without intermediate reloading which is ~~. It must be~~ of a permanent enclosed character, rigid and strong enough for repeated use, and must be fitted with devices facilitating its handling, particularly in transfer between aircraft and from one mode of transport to another. A small freight container is that which has either an overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m^3. Any other freight container is considered to be a large freight container.

. . .

Specific activity of a radionuclide. The activity per unit mass of that nuclide. The specific activity of a material must mean the activity per unit mass ~~or volume~~ of the material in which the radionuclides are essentially uniformly distributed.

. . .

Uranium — natural, depleted, enriched:

Natural uranium. ~~Chemically separated uranium~~ Uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28 per cent uranium-238, and 0.72 per cent uranium-235 by mass).

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7.3 LOW SPECIFIC ACTIVITY (LSA) MATERIAL, DETERMINATION OF GROUPS

7.3.1 Radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply, is termed low specific activity or LSA material. External shielding materials surrounding the LSA material must not be considered in determining the estimated average specific activity.

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

iii) radioactive material for which the A_2 value is unlimited, excluding fissile material in quantities not excepted under 6;7.10.2; 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 7.7.2.1 to 7.7.2.6, excluding fissile material in quantities not excepted under 6;7.10.2.

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7.4 REQUIREMENTS FOR SPECIAL FORM RADIOACTIVE MATERIAL

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7.4.6 Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

a) the tests prescribed in 7.4.5 a) and b) provided the mass of the special form radioactive material:

i) is less than 200 g and they are alternatively subjected to the Class 4 impact test prescribed in ISO 2919:~~1980~~1990 "Radiation protection — Sealed radioactive sources — General requirements and ~~C~~classification"; ~~and~~ or

ii) is less than 500 g and they are alternatively subjected to the Class 5 impact test prescribed in ISO 2919:1990: "Sealed Radioactive Sources — Classification; and

b) the test prescribed in 7.4.5 d) provided they are alternatively subjected to the Class 6 temperature test specified in ISO 2919:~~1980~~1990 "Radiation protection — Sealed radioactive sources — General requirements and ~~C~~classification".

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7.7 ACTIVITY LIMITS AND MATERIAL RESTRICTIONS

7.7.1 Contents limits for packages

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7.7.1.7 *Packages containing fissile material*

Unless excepted by 6;7.10.2, ~~P~~packages containing fissile material must not contain:

a) a mass of fissile material 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.

7.7.1.8 *Packages containing uranium hexafluoride*

~~The mass of uranium hexafluoride in a package must not exceed a value that would lead to an ullage smaller than 5 per cent at the maximum temperature of the package, as specified for the plant systems where the package must be used. The uranium hexafluoride must be in solid form and the internal pressure of the package must be below atmospheric pressure when presented for transport.~~

Packages containing uranium hexafluoride must not contain:

a) a mass of uranium hexafluoride different from that authorized for the package design;

b) a mass of uranium hexafluoride greater than a value that would lead to an ullage smaller than 5 per cent at the maximum temperature of the package as specified for the plant systems where the package will be used; or

c) uranium hexafluoride other than in solid form or at an internal pressure above atmospheric pressure when presented for transport.

7.7.2 Activity levels

7.7.2.1 The following basic values for individual radionuclides are given in Table 2-13:

a) A_1 and A_2 in TBq;

b) activity concentration for exempt material in Bq/g; and

c) activity limits for exempt consignments in Bq.

7.7.2.2 For individual radionuclides which are not listed in Table 2-13, the determination of the basic radionuclide values referred to in 7.7.2.1 must require ~~competent authority approval or, for international transport,~~ multilateral approval. ~~Where the chemical form of each radionuclide is known, i~~It is permissible to use the A_2 value ~~related to its solubility class~~ calculated using a dose coefficient for the appropriate lung absorption type as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 2-14 may be used without obtaining competent authority approval.

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Table 2-13. 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)*
. . .				
Te-121m	5×10^0	3×10^0	1×10^2	~~1×10^5~~ 1×10^6
. . .				

(a) A_1 and/or A_2 values for these parent radionuclides include contributions from daughter radionuclides with half-lives less than 10 days, as listed in the following:

Mg-28	Al-28
Ar-42	K-42
Ca-47	Sc-47
Ti-44	Sc-44
Fe-52	Mn-52m
Fe-60	Co-60m
Zn-69m	Zn-69
Ge-68	Ga-68
Rb-83	Kr-83m
Sr-82	Rb-82
Sr-90	Y-90
Sr-91	Y-91m
Sr-92	Y-92
Y-87	Sr-87m
Zr-95	Nb-95m
Zr-97	Nb-97m, Nb-97
Mo-99	Tc-99m
Tc-95m	Tc-95

Radionuclide (atomic number)		*A_1 (TBq)*	*A_2 (TBq)*	*Activity concentration for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Tc-96m	Tc-96				
Ru-103	Rh-103m				
Ru-106	Rh-106				
Pd-103	Rh-103m				
Ag-108m	Ag-108				
Ag-110m	Ag-110				
Cd-115	In-115m				
In-114m	In-114				
Sn-113	In-113m				
Sn-121m	Sn-121				
Sn-126	Sb-126m				
Te-118	Sb-118				
Te-127m	Te-127				
Te-129m	Te-129				
Te-131m	Te-131				
Te-132	I-132				
I-135	Xe-135m				
Xe-122	I-122				
Cs-137	Ba-137				
Ba-131	Cs-131				
Ba-140	La-140				
Ce-144	Pr-144m, Pr-144				
Pm-148m	Pm-148				
Gd-146	Eu-146				
Dy-166	Ho-166				
Hf-172	Lu-172				
W-178	Ta-178				
W-188	Re-188				
Re-189	Os-189m				
Os-194	Ir-194				
Ir-189	Os-189m				
Pt-188	Ir-188				
Hg-194	Au-194				
Hg-195m	Hg-195				
Pb-210	Bi-210				
Pb-212	Bi-212, Tl-208, Po-212				
Bi-210m	Tl-206				
Bi-212	Tl-208, Po-212				
At-211	Po-211				
Rn-222	Po-218, Pb-214, At-218, Bi-214, Po-214				
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207				
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212				

Radionuclide (atomic number)	A_1 *(TBq)*	A_2 *(TBq)*	*Activity concentration for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Ra-225	Ac-225, Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209			
Ra-226	Rn-222, Po-218, Pb-214, At-218, Bi-214, Po-214			
Ra-228	Ac-228			
Ac-225	Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209			
Ac-227	Fr-223			
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212			
Th-234	Pa-234m, Pa-234			
Pa-230	Ac-226, Th-226, Fr-222, Ra-222, Rn-218, Po-214			
U-230	Th-226, Ra-222, Rn-218, Po-214			
U-235	Th-231			
Pu-241	U-237			
Pu-244	U-240, Np-240m			
Am-242m	Am-242, Np-238			
Am-243	Np-239			
Cm-247	Pu-243			
Bk-249	Am-245			
Cf-253	Cm-249			

(b) Parent nuclides and their progeny included in secular equilibrium are listed in the following:

Sr-90	Y-90
Zr-93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Ag-108m	Ag-108
Cs-137	Ba-137m
~~Ce-134~~	~~La-134~~
Ce-144	Pr-144
Ba-140	La-140
Bi-212	Tl-208 (0.36), Po-212 (0.64)
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0.36), Po-212 (0.64)
~~Rn-220~~	~~Po-216~~
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
~~Th-226~~	~~Ra-222, Rn-218, Po-214~~
Th-228	Ra-224, Rn-220, Po-216, Pb212, Bi-212, Tl208 (0.36), Po-212 (0.64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th-nat	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)

Radionuclide (atomic number)		*A_1 (TBq)*	*A_2 (TBq)*	*Activity concentration for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Th-234	Pa-234m				
U-230	Th-226, Ra-222, Rn-218, Po-214				
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)				
U-235	Th-231				
U-238	Th-234, Pa-234m				
U-nat	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210				
~~U-240~~	~~Np-240m~~				
Np-237	Pa-233				
Am-242m	Am-242				
Am-243	Np-239				

. . .

Table 2-14. Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	*A_1 (Tbq)*	*A_2 (Tbq)*	*Activity concentration for exempt material (Bq/g)*	*Activity limit for an exempt consignment (Bq)*
Only beta- or gamma-emitting nuclides are known to be present	0.1	0.02	1×10^{1}	1×10^{4}
~~Only a~~Alpha-emitting nuclides but no neutron emitters are known to be present	0.2	9×10^{-5}	1×10^{-1}	1×10^{3}
Neutron emitting nuclides are known to be present or ~~N~~no relevant data are available	0.001	9×10^{-5}	1×10^{-1}	1×10^{3}

7.8 LIMITS ON TRANSPORT INDEX, CRITICALITY SAFETY INDEX, RADIATION LEVELS FOR PACKAGES AND OVERPACKS

7.8.1 Except for consignments under exclusive use, the transport index of any package or overpack must not exceed 10, nor must the criticality safety index of any package or overpack exceed 50.

7.8.2 Except for packages or overpacks transported under exclusive use and special arrangement under the conditions specified in 7;2.9.5.3, the maximum radiation level at any point on any external surface of a package or overpack must not exceed 2 mSv/h.

7.8.3 The maximum radiation level at any point on any external surface of a package or overpack under exclusive use must not exceed 10 mSv/h.

7.8.4 Packages and overpacks must be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 2-15 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 7.6.1.1 and 7.6.1.2;

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 under the provisions of 7.8.5;

e) an overpack which contains packages transported under special arrangement must be assigned to category III-YELLOW except under the provisions of 7.8.5.

7.8.5 In case 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, assignment to the category as required in 7.8.4 must be in accordance with the certificate of the country of origin of design.

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Chapter 8
CLASS 8 — CORROSIVES

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8.2 ASSIGNMENT OF PACKING GROUPS

8.2.1 Substances and preparations of Class 8 are divided among the three packing groups according to their degree of hazard in transport as follows:

a) Packing Group I: Very dangerous substances and preparations;

b) Packing Group II : Substances and preparations presenting medium danger;

c) Packing Group III: Substances and preparations presenting minor danger.

8.2.2 Allocation of substances in Class 8 to the packing groups referred to in the introduction to Part 3, Chapter 1 has been on the basis of experience, taking into account such additional factors as inhalation risk and reactivity with water, including the formation of hazardous decomposition products. New substances, including mixtures, can be assigned to packing groups on the basis of the length of time of contact necessary to produce full thickness destruction of human skin. ~~Substances~~ Liquids, and solids

which may become liquid during transport, which are judged not to cause full thickness destruction of human skin must still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 8.2.5 c) (ii).

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Part 3

**DANGEROUS GOODS LIST
AND
LIMITED QUANTITIES EXCEPTIONS**

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**Chapter 2
ARRANGEMENT OF THE
DANGEROUS GOODS LIST (TABLE 3-1)**

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Editorial Note.— Amendments to Table 3-1 are presented in Attachments A and B to this appendix. Attachment A contains the amendments in alphabetical order, and Attachment B contains the amendments in UN No. order.

The format for displaying these amendments is described below:

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.

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Chapter 3
SPECIAL PROVISIONS

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A7 ~~Solutions with a flash point of 60.5°C or less must bear a FLAMMABLE LIQUID label.~~Not used.

A8 ~~Not used.~~When transported in non-friable tablet form, these goods are assigned to Packing Group III.

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A14 ~~Not used.~~The label conforming to Figure 5-13 may be used until 31 December 2010.

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A20 During the course of transport this substance must be protected from direct ~~sunshine~~ sunlight and ~~stored in a cool~~ all sources of heat and be placed in ~~well~~ adequately ventilated ~~place, away from all sources of heat~~ areas. A statement to this effect must be included in the Dangerous Goods Transport Document.

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A23 In the case of non-fissile or fissile excepted uranium hexafluoride, the material must be classified under UN No 2978.

. . .

A32 Air bags or seat-belts installed in ~~vehicles~~ conveyances or in completed ~~vehicle~~ conveyance components such as steering columns, door panels, seats, etc. which are not capable of inadvertent activation are not subject to these Instructions.

. . .

A44 Chemical kits or first aid kits include boxes, cases, etc. containing small amounts of one or more compatible items of dangerous goods which are used for example for medical, analytical or testing or repair purposes.

The only dangerous goods which are permitted in the kits are substances which may be transported as:

a) excepted quantities, under 1;2.4.2.2 provided the inner packagings and quantities are as prescribed in 1;2.4.3 a) and 1;2.4.4 a); or

b) limited quantities under 3;4.1.2.

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A46 Mixtures of solids which are not subject to these Instructions and flammable liquids may be transported under this entry without first applying the classification criteria of Division 4.1, providing there is no free liquid visible at the time the substance is packaged and the packaging must pass a leakproofness test at the Packing Group II level. Small inner packagings consisting of sealed packets or articles containing less than 10 mL of a Packing Group II or III flammable liquid absorbed into a solid material are not subject to these Instructions provided there is no free liquid in the packet or articles.

. . .

A63 ~~Suspensions with a flash point of not more than 60.5°C must bear a flammable liquid subsidiary risk label.~~Not used.

. . .

A66 ~~The organic peroxide included in a Polyester Resin Kit must be one of those listed in Table 3-1 as permitted for transport.~~Polyester resin kits consist of two components: a base material (Class 3, Packing Group II or III) and an activator (Division 5.2). Only organic peroxides that are authorized for transport on passenger aircraft are permitted in the kits. Those requiring temperature control are forbidden. Packing Group II or III is assigned according to the criteria for Class 3, applied to the base material.

A67 Non-spillable batteries meeting the requirements of Packing Instruction 806 are not subject to these Instructions if, at a temperature of 55°C, the electrolyte will not flow from a ruptured or cracked case. ~~and there is no free liquid to flow and if,~~ The battery must not contain any free or unabsorbed liquid. W~~w~~hen packaged for transport, the terminals ~~are~~ must be protected from short circuit such as by the use of non-conductive caps that entirely cover the terminals.

. . .

A70 ~~Machines or other apparatuses, incorporating an i~~Internal combustion engines~~,~~ being shipped either separately or incorporated into a machine or other apparatus, the fuel tank of which has never contained any fuel, the fuel system of which is completely empty of fuel and without batteries or other dangerous goods, are not subject to these Instructions.

. . .

A75 Articles such as sterilization devices, when containing less than 30 mL per inner packaging with not more than 150 mL per outer packaging, may be transported on passenger and cargo aircraft in accordance with the provisions in 1;2.4, irrespective of 1;2.4.2.2 and the indication of "forbidden" in columns 9 to 12 of the Dangerous Goods List (Table 3-1), provided such packagings were first subjected to comparative fire testing. Comparative fire testing must show no difference in burning rate between a package as prepared for transport (including the substance to be transported) and an identical package filled with water.

A76 ~~Not used.~~In the case of fissile uranium hexafluoride, the material must be classified under UN No. 2977.

. . .

A88 Prototype lithium batteries and 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) the cells and 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) each cell and 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 batteries must be protected against short circuiting.

. . .

A97 ~~The designation of this substance is to be decided by the appropriate national authority. Substances classified as UN 3077 or UN 3082 by the regulations of other modes of transport may also be transported by air under these entries. This designation~~These entries may be used for substances ~~and mixtures~~ which are ~~dangerous~~ hazardous to the ~~aquatic~~ environment ~~or which are marine pollutants that~~ but do not meet the classification criteria of any other class or ~~an~~other substance within Class 9. This must be based on the criteria in the Regulations of other modes of transport or criteria recognized by the appropriate authority of the State of origin, transit or destination. This designation may also be used for wastes not otherwise subject to these Instructions but which are covered under the *Basle Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal* ~~and for substances designated to be environmentally hazardous substances by the appropriate authority of the State of Origin, transit or destination~~.

Note.— If any document has been issued in relation to such designation, it is not required to accompany a consignment.

A98 Aerosols, 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 not subject to these Instructions unless their release could cause extreme annoyance or discomfort to crew members so as to prevent the correct performance of assigned duties.

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A121 ~~The entries of Vehicle (flammable gas powered) or Vehicle (flammable liquid powered), as appropriate, must be used when internal combustion engines are installed in a vehicle.~~Not used.

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A124 ~~Only m~~Mixtures ~~with~~ 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.

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A126 ~~Even though the substance has a flammability hazard, it only exhibits such hazards under extreme fire conditions in confined areas.~~Not used.

A127 ~~Packages containing mixtures with a flashpoint of less than 60.5°C must bear a subsidiary risk label.~~Not used.

. . .

A131 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 1;2.4, irrespective of 1;2.4.2.2 and the indication of "Forbidden" in columns 9 to 12 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 1;2.4, 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).

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A138 This entry applies only to calcium hypochlorite, dry ~~or hydrated~~, when transported in non-friable tablet form.

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A141 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 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.

All other requirements applicable to chemical oxygen generators must apply except that the "cargo aircraft only" handling label must not be displayed.

A145 Waste aerosols are prohibited from air transport.

A146 This entry applies to fuel cell cartridges containing flammable liquids including methanol or methanol/water solutions. Fuel cell cartridge means a container that stores fuel for discharge into fuel cell powered equipment through a valve(s) that controls the discharge of fuel into such equipment and is free of electric charge generating components. The cartridge must be designed and constructed to prevent the fuel from leaking during normal conditions of transport.

This entry applies to fuel cell cartridge design types shown without their packaging to pass an internal pressure test at a pressure of 100 kPa (gauge).

A147 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.

A148 Alcohols containing petroleum products (e.g. gasoline) up to 5 per cent must be transported under the entry UN 1987 **Alcohols, n.o.s.**

A149 For environmentally hazardous substances meeting the criteria of 2.9.3 of the UN Recommendations, an additional mark as specified in 5;2.4.9 must be applied.

A150 An additional subsidiary risk hazard label may be required by a Note found adjacent to the technical name entry in Table 2-7.

A151 When dry ice is used as a refrigerant for other than dangerous goods loaded in a unit load device or other type of pallet, the quantity limits per package shown in columns 10 and 12 in Table 3-1 for dry ice do not apply. In such case, the unit load device or other type of pallet must be identified to the operator and must allow the venting of the carbon dioxide gas to prevent a dangerous build up of pressure.

A152 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 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.

A153 Plastic aerosols of a capacity greater than 120mL (IP.7C) are only permitted when the propellant is non-flammable and non-toxic and the contents are not dangerous goods in accordance with the provisions of the Technical Instructions.

Chapter 4
DANGEROUS GOODS IN LIMITED QUANTITIES

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4.1 APPLICABILITY

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4.1.2 Only dangerous goods which are permitted on passenger aircraft and which meet the criteria of the following classes, divisions and packing groups (if appropriate) may be carried under these provisions for dangerous goods in limited quantities:

Divisions 2.1 and 2.2	~~Aerosols~~ UN1950 and UN 2037 without subsidiary risk

~~Division 2.2~~ ~~Gases without subsidiary risk but excluding refrigerated liquefied gases~~

. . .

4.3 QUANTITY LIMITATIONS

4.3.1 The net quantity per package must not exceed the quantity specified in column 10 of Table 3-1 against the packing instruction number identified by the prefix letter "Y" in column 9.

4.3.2 The gross mass per package must not exceed 30 kg.

4.3.3 When different dangerous goods are contained in one outer packaging, the quantities of such dangerous goods must be so limited that:

a) for classes other than Classes 2 and 9, the total net quantity in the package does not exceed the value of 1, where "Q" is calculated using the formula:

$$Q = \frac{n_1}{M_1} + \frac{n_2}{M_2} + \frac{n_3}{M_3} + \ldots$$

where n_1, n_2 etc., are the net quantities of the different dangerous goods and M_1, M_2 etc., are the maximum net quantities for these different dangerous goods shown in Table 3-1 against the relevant "Y" packing instructions; and

b) for Classes 2 and 9:

1) when packed together without goods of other classes, the gross mass of the package does not exceed 30 kg; or

2) when packed together with goods of other classes, the gross mass of the package does not exceed 30 kg and the total net quantity in the package of goods other than in Classes 2 or 9 does not exceed the value of 1 when calculated according to a) above.

c) carbon dioxide, solid (dry ice), UN 1845 may be packed together with goods of other classes, provided that the gross mass of the package does not exceed 30 kg. The quantity of dry ice does not need to be taken into account in the calculation of the "Q" value. However, the packaging containing the carbon dioxide, solid (dry ice) and the outer packaging must permit the release of carbon dioxide gas.

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Part 4

PACKING INSTRUCTIONS

. . .

Chapter 1
GENERAL PACKING REQUIREMENTS

. . .

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.

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

1.1.3.2 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. ~~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.~~

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

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 ;

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 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.

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1.1.6 Packagings for which retention of liquid is a basic function must be capable of withstanding without leakage an internal pressure which produces a pressure differential of not less than 95 kPa (not less than 75 kPa for liquids in Packing Group III of Class 3 or Division 6.1), 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 as either:

a) the total gauge pressure measured in the packaging (i.e. the vapour pressure of the filling substance and the partial pressure of the air or other inert gases, less 100 kPa) at 55°C, multiplied by a safety factor of 1.5; this total gauge pressure should be determined on the basis of a degree of filling in accordance with 1.1.5 and a filling temperature of 15°C; or

b) 1.75 times the vapour pressure at 50°C less 100 kPa, but with a minimum of 95 kPa.

This is expressed as:

$P = (V_{p50} \times 1.75) - 100$ kPa with a minimum of 95 kPa

where

P = Pressure requirement in kPa (gauge)
V_{p50} = Vapour pressure at 50°C; or

c) 1.5 times the vapour pressure at 55°C less 100 kPa, but with a minimum of 95 kPa.

This is expressed as:

$P = (V_{p55} \times 1.5) - 100$ kPa with a minimum of 95 kPa

where

P = Pressure requirement in kPa (gauge)
V_{p55} = Vapour pressure at 55°C.

Note.— The capability of a packaging to withstand an internal pressure without leakage that produces the specified pressure differential should be determined by testing samples of inner packagings of combination packagings and single packagings. Pressure differential is the difference between the pressure exerted on the inside of the packaging and the pressure on the outside. The appropriate test method should be selected based on packaging type. Acceptable test methods include any method that produces the required pressure differential between the inside and outside of a single packaging or an inner packaging of a combination packaging. The test may be conducted using internal hydraulic or pneumatic pressure (gauge) or external vacuum test methods. Internal hydraulic or pneumatic pressure can be applied in most cases as the required pressure differential can be achieved under most

circumstances. An external vacuum test is not acceptable if the specified pressure differential is not achieved and maintained. The external vacuum test is a generally acceptable method for rigid packagings but is not normally acceptable for:

— *flexible packagings;*

— *packagings filled and closed under an absolute atmospheric pressure lower than 95 kPa or for liquids in Packing III of Class 3 or Division 6.1 with an absolute pressure of 75 kPa;*

— *packagings intended for the transport of high vapour pressure liquids (i. e. vapour pressure greater than 111 kPa at 50 °C or 130 kPa at 55 °C and accordingly greater than 100 kPa at 50 °C or 117 kPa at 55 °C for liquids in Packing III of Class 3 or Division 6.1.*

1.1.6.1 Notwithstanding the foregoing, dangerous goods may be contained in an inner packaging which does not itself meet the pressure requirement provided that the inner packaging is packed within a supplementary packaging which does meet the pressure requirement and all the other requirements of this Chapter and the applicable packing instruction.

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1.1.9 Inner packagings must be so packed, secured or cushioned in an outer packaging in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the outer packaging ~~and so as to control their movement~~. Inner packagings containing liquids must be packaged with their closures upward and placed within outer packagings consistent with the orientation markings prescribed in 5;3.2.11 b) of these Instructions. Inner packagings that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastic material, etc., must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not substantially impair the protective properties of the cushioning material or of the outer packaging.

Editorial Note.— The following new paragraph was moved from 6;4.1.6 with "or large packaging" added at the end of the first sentence.

1.1.9.1 Where an outer packaging of a combination packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging or large packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:

a) inner packagings of equivalent or smaller size may be used provided:

1) the inner packagings are of similar design to the tested inner packagings (e.g. shape — round, rectangular, etc.);

2) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;

3) the inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);

4) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and

5) inner packagings are oriented within the outer packaging in the same manner as in the tested package.

b) a lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.

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~~1.1.20 Packagings including those used for limited quantities of dangerous goods must be marked as prescribed in 5;2.4.12 only when the shipper has determined that the packaging meets the applicable requirements, particularly those packaging requirements that are only applicable for air transport (e.g. the relevant packing instruction requirements, pressure differential test, requirement to provide absorbent material and closure requirements).~~

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1.4 SALVAGE PACKAGINGS

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1.4.2 Salvage packagings must be single packagings of a material resistant to any chemical or other action of the leaking or spilled dangerous goods ~~and with a performance level applicable to the packing group of the leaking or spilled dangerous goods according to column 8 of Table 3-1 or to the packing group specified in the packing instruction for those goods, whichever is the higher~~. Not more than one damaged, defective or leaking package of dangerous goods may be packed in any one of such single packagings.

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Chapter 2
GENERAL

2.1 Each of the succeeding Chapters of this Part is devoted to the specific packing instructions applicable to an individual class of dangerous goods. In some cases the Chapters start with general requirements which apply to all goods in that class.

2.2 The Dangerous Goods List (Table 3-1) shows for each article or substance, in columns 9 and 11, the number of the packing instruction that must be used.

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). 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.

2.4 Unless otherwise specified, each packaging must conform to the applicable requirements of Part 6. Generally packing instructions do not provide guidance on compatibility and the user must not select a packaging without checking that the substance is compatible with the packaging material selected (e.g. most fluorides are unsuitable for glass receptacles). Where glass receptacles are permitted in the packing instructions porcelain, earthenware and stoneware packagings are also allowed.

2.5 The following packagings must not be used when the substances being transported are liable to become liquid during transport:

Drums:	1D and 1G
Boxes:	4C1, 4C2, 4D, 4F, 4G and 4H1
Bags:	5L1, 5L2, 5L3, 5H1, 5H2, 5H3, 5H4, 5M1 and 5M2
Composite packagings:	6HC, 6HD2, 6HG1, 6HG2, 6HD1, 6PC, 6PD1, 6PD2, 6PG1, 6PG2 and 6PH1

~~2.4~~2.6 Where the packing instructions in this part authorize the use of a particular type of outer packaging (e.g. 4G, 1A2), packagings bearing the same packaging identification code followed by the letters "V", "U" or "W" marked in accordance with the requirements of 6;4.1.7 h) (e.g. 4GV, 4GU or 4GW; 1A2V, 1A2U or 1A2W) may also be used under the same conditions and limitations applicable to the use of that type of packaging according to the relevant packing instruction. For example, a combination packaging marked with the packaging code "4GV" may be used whenever a combination packaging marked "4G" is authorized, provided the requirements in the relevant packing instruction regarding types of inner packagings and quantity limitations are respected.

2.7 Cylinders may be used for liquids and solids when indicated in a packing instruction. The cylinder must meet the standards set out below.

2.7.1 Unless otherwise indicated in these Instructions, cylinders conforming to:

a) the applicable requirements of Part 6 Chapter 5 or

b) the national or international standards on the design, construction, testing, manufacturing and inspection, as applied by the country in which the cylinders are manufactured, provided that the provisions of 2.7 and 6;5.3.3 are met.

2.7.2 Every design type of cylinder must be approved by the competent authority of the country of manufacture or as indicated in Part 6, Chapter 5.

2.7.3 Unless otherwise indicated, cylinders having a minimum test pressure of 0.6 MPa must be used.

2.7.4 Unless otherwise indicated, cylinders may be provided with an emergency pressure relief device designed to avoid bursting in case of overfill or fire accidents.

Cylinder 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, by one of the methods as given in 4; 4.1.1.8 (a) to (e)

2.7.5 The level of filling must not exceed 95 percent of the capacity of the cylinder at 50 °C. Sufficient ullage (outage) must be left to ensure that the cylinder will not be liquid full at a temperature of 55 °C.

2.7.6 Unless otherwise indicated cylinders must be subjected to a periodic inspection and test every 5 years. The periodic inspection must include an external examination, an internal examination or alternative method as approved by the competent authority, a pressure test or equivalent effective non-destructive testing with the agreement of the competent authority including an inspection of all accessories (e.g. tightness of valves, emergency relief valves of fusible elements). Cylinders must not be filled after they become due for periodic inspection and test but may be transported after the expiry of the time limit. Cylinder repairs must meet the requirements of 4; 4.1.1.11.

2.7.7 Prior to filling, the filler must perform an inspection of the cylinder and ensure that the cylinder is authorized for the substances to be transported and that the provisions of these Instructions have been met. Shut-off valves must be closed after filling and remain closed during transport. The consignor must verify that the closures and equipment are not leaking.

2.7.8 Refillable cylinders must not be filled with a substance different from that previously contained unless the necessary operations for change of service have been performed.

2.7.9 Marking of cylinders for liquids and solids according to 2.7 (not conforming to the requirements of Chapter 6.2) must be in accordance with the requirements of the competent authority of the country of manufacturing.

Editorial Note.— Renumber subsequent paragraphs accordingly.

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Chapter 3
CLASS 1 — EXPLOSIVES

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131	PACKING INSTRUCTION 131	131

Inner packagings	*Intermediate packagings*	*Outer packagings*
Bags	Not necessary	Boxes
paper		aluminium (4B)
plastic		fibreboard (4G)
Receptacles		natural wood, ordinary (4C1)
fibreboard		natural wood, with sift-proof walls (4C2)
metal		plywood (4D)
plastic		reconstituted wood (4F)
wood		steel (4A)
Reels		Drums
		aluminium, removable head (1B2)
		fibre (1G)
		plastic, removable head (1H2)
		plywood (1D)
		steel, removable head (1A2)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

— For UN 0029, 0267 and 0455, bags and reels must not be used as inner packagings.

— ~~Reels should only be used as inner packagings for UN 0030, 0255, 0360, 0361, 0456 and 0500.~~

133	PACKING INSTRUCTION 133	133

Inner packagings	*Intermediate packagings*	*Outer packagings*
Receptacles	Receptacles	Boxes
fibreboard	fibreboard	aluminium (4B)
metal	metal	fibreboard (4G)
plastic	plastic	natural wood, ordinary (4C1)
wood	wood	natural wood, with sift-proof walls (4C2)
Trays, fitted with dividing partitions		plywood (4D)
fibreboard		reconstituted wood (4F)
plastic		solid plastic (4H2)
wood		steel (4A)

PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS:

~~— Trays should only be used as inner packagings for UN 0044, 0073, 0319, 0320, 0364, 0365, 0366, 0376, 0377 and 0378.~~
— Receptacles are only required as intermediate packagings when the inner packagings are trays.
— For UN 0043, 0212, 0225, 0268 and 0306, trays must not be used as inner packagings.

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Chapter 4
CLASS 2 — GASES

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4.1 SPECIAL PACKING PROVISIONS FOR DANGEROUS GOODS OF CLASS 2

4.1.1 General requirements

4.1.1.1 This section provides general requirements applicable to the use of cylinders and closed cryogenic receptacles for the transport of Class 2 gases (e.g. UN 1072 **Oxygen, compressed)**. Cylinders and closed cryogenic receptacles must be constructed and closed so as to prevent any loss of contents which might be caused under normal conditions of transport, including by vibration, or by changes in temperature, humidity or pressure (resulting from change in altitude, for example).

4.1.1.2 Parts of cylinders and closed cryogenic receptacles that are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). The provisions of ISO 11114-1:1997 and ISO 11114-2:2000 must be met as applicable. Cylinders for UN 1001 **Acetylene, dissolved** and UN 3374 **Acetylene, solvent free** must be filled with a porous mass, uniformly distributed, of a type that conforms to the requirements and testing specified by the appropriate national authority and which:

a) is compatible with the cylinder and does not form harmful or dangerous compounds either with the acetylene or with the solvent in the case of UN 1001; and

b) is capable of preventing the spread of decomposition of the acetylene in the porous mass.

In the case of UN 1001, the solvent must be compatible with the cylinders.

4.1.1.3 Cylinders and closed cryogenic receptacles, including their closures, must be selected that are able to contain a gas or a mixture of gases according to the requirements of 6;5.1.2 and the requirements of the specific packing instructions of this Part.

4.1.1.4 Refillable cylinders must not be filled with a gas or gas mixture different from that previously contained unless the necessary operations for change of gas service have been performed. The change of service for compressed and liquefied gases must be in accordance with ISO 11621:1997, as applicable. In addition, a cylinder that previously contained a Class 8 corrosive substance or a substance of another class with a corrosive subsidiary risk must not be authorized for the transport of a Class 2 substance unless the necessary inspection and testing as specified in 6;5.1.5 have been performed.

4.1.1.5 Prior to filling, the filler must perform an inspection of the cylinder or closed cryogenic receptacle and ensure that the cylinder or closed cryogenic receptacle ~~is~~ are authorized for the gas to be transported and that the provisions of these Instructions have been met. Shut-off valves must be closed after filling and remain closed during transport. The shipper must verify that the closures and equipment are not leaking.

4.1.1.6 Cylinders and closed cryogenic receptacles must be filled according to the working pressures, filling ratios and provisions specified in the appropriate packing instruction for the specific substance. Reactive gases and gas mixtures must be filled to a pressure such that if complete decomposition of the gas occurs, the working pressure of the cylinder must not be exceeded.

4.1.1.7 Cylinders and closed cryogenic receptacles, including their closures, must conform to the design, construction, inspection and testing requirements detailed in Part 6, Chapter 5. When outer packagings are prescribed, the cylinders must be firmly secured therein. Unless otherwise specified in the detailed packing instructions, one or more inner packagings may be enclosed in an outer packaging.

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 ISO11117:1998 must be met; for valves with inherent protection, the requirements of annex B of ISO 10297:1999 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) ~~be of a water capacity less than or equal to 1.25 litres when filled with flammable or toxic gas~~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; 5.1.5 and packing instruction PI 200 . 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.

4.1.1.11 Repairs must be consistent with the fabrication and testing requirements of the applicable design and construction standards and are only permitted as indicated in the relevant periodic inspection standards specified in 6;5.2.4. Cylinders, other than the jacket of closed cryogenic receptacles, must not be subjected to repairs of any of the following;

a) weld cracks or other weld defects;

b) cracks in walls;

c) leaks or defects in the material of the wall, head or bottom.

4.1.1.12 Cylinders and closed cryogenic receptacles must not be offered for filling:

a) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;

b) unless the cylinder and closed cryogenic receptacle and its service equipment have been examined and found to be in good working order; or

c) unless the required certification, retest, and filling markings are legible.

4.1.1.13 Filled cylinders and closed cryogenic receptacles must not be offered for transport;

a) when leaking;

b) when damaged to such an extent that the integrity of the cylinder and closed cryogenic receptacle or its service equipment may be affected;

c) unless the cylinder and closed cryogenic receptacle and its service equipment has been examined and found to be in good working order; or

d) unless the required certification, retest, and filling markings are legible.

200	PACKING INSTRUCTION 200	200

For cylinders, the general packing requirements of 4.1.1 must be met.

Cylinders, constructed as specified in Part 6, Chapter 5 are authorized for the transport of a specific substance when specified in the following tables (Table 1 and Table 2). 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 in which they are approved and filled. The substances contained must be permitted in cylinders and permitted for air transport according to these Instructions. Cylinders for which prescribed periodic tests have become due must not be charged and offered for transport until such retests have been successfully completed. Valves must be suitably protected or must be designed and constructed in such a manner that they are able to withstand damage without leakage as specified in Annex B of ISO 10297:1999. Cylinders with capacities of one litre or less must be packaged in outer packaging constructed of suitable material of adequate strength and design in relation to the packaging capacity and its intended use, and secured or cushioned so as to prevent significant movement within the outer packaging during normal conditions of transport. For some substances, the special packing provisions may prohibit a particular type of cylinder. The following requirements must be met:

~~a~~1) Pressure relief devices must be fitted on cylinders used for the transport of UN 1013 **Carbon dioxide** and UN 1070 **Nitrous oxide**. Other cylinders must be fitted with a pressure relief device if specified by the appropriate national authority of the country of use. The type of pressure relief device, the set to discharge pressure and relief capacity of pressure relief devices, if required, must be specified by the appropriate national authority of the country of use. Manifolding of cylinders is not permitted.

~~b~~2) The following two tables cover compressed gases (Table 1) and liquefied and dissolved gases (Table 2). They provide:

~~1~~a) the UN number, name and description, and classification of the substance;
~~2~~b) the LC_{50} for toxic substances;
~~3~~c) the types of cylinders authorized for the substance, shown by the letter "X";
~~4~~d) the maximum test period for periodic inspection of the cylinders;
~~5~~e) the minimum test pressure of the cylinders;
~~6~~f) the maximum working pressure of the cylinders for compressed gases (where no value is given, the working pressure must not exceed two thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
~~7~~g) special packing provisions that are specific to a substance.

~~c~~3) In no case must cylinders be filled in excess of the limit permitted in the following requirements:

~~1~~a) For compressed gases, the working pressure must be not more than two thirds of the test pressure of the cylinders. Restrictions to this upper limit on working pressure are imposed by special packing provision "o". In no case must the internal pressure at 65°C exceed the test pressure.

~~2~~b) For high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not exceed the test pressure of the cylinders.

The use of test pressures and filling ratios other than those in the table is permitted provided that the above criterion is met, except where special packing provision "o" applies.

For high pressure liquefied gases and gas mixtures for which relevant data ~~is~~ are not ~~provided in the table~~ available, the maximum filling ratio (FR) must be determined as follows:

$FR = 8.5 \times 10^{-4} \times d_g \times P_h$

where FR = maximum filling ratio
d_g = gas density (at 15°C, 1 bar)(in g/l)
P_h = minimum test pressure (in bar)

If the density of the gas is unknown, the maximum filling ratio must be determined as follows:

$$FR = \frac{P_h \times MM \times 10^{-3}}{R \times 338}$$

where FR = maximum filling ratio
P_h = minimum test pressure (in bar)
MM = molecular mass (in g/mol)
R = 8.31451 x 10^{-2} bar.l/mol.K (gas constant)

For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components.

~~3~~c) For low pressure liquefied gases, the maximum mass of contents per litre of water capacity (filling factor) must equal 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not fill the cylinder at any temperature up to 60°C. The test pressure of the cylinder must be at least equal to the vapour pressure (absolute) of the liquid at 65°C, minus 100 kPa (1 bar).

For low pressure liquefied gases for which filling data is not provided in the table, the maximum filling ratio must be determined as follows:

$FR = (0.0032 \times BP - 0.24) \times d_l$

where FR = maximum filling ratio
BP = boiling point (in Kelvin)
d_l = density of the liquid at boiling point (in kg/l)

~~4~~d) For UN 1001, **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, see ~~i~~p).

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

Material compatibility (for gases see ISO 11114-1:1997 and ISO 11114-2:2000)

~~1~~a) Aluminium alloy cylinders are not authorized.
~~2~~b) Copper valves must not be used.
~~3~~c) Metal parts in contact with the contents must not contain more than 65 per cent copper.
~~4~~d) When steel cylinders are used, only those bearing the "H" mark must be authorized.

Gas specific provisions:

~~e~~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 ~~total quantity~~ 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.

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

~~g) A cylinder must contain not more than 5 kg of the gas.~~

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

~~i~~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.

~~j~~r) Ethyl chloride may be carried in securely sealed glass ampoules (IP.8) containing not more than 5 g of ethyl chloride and filled with an ullage of not less than 7.5 per cent at 21°C. Ampoules must be cushioned with efficient non-combustible material in partitioned cartons to the extent of 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.

~~k~~s) Aluminium alloy cylinders must be:

— Equipped only with brass or stainless steel valves; and
— Cleaned in accordance with ISO 11621:1997 and not contaminated with oil.

Periodic inspection:

~~l~~u) The interval between periodic tests may be extended to 10 years for aluminium alloy cylinders when the alloy of the cylinder has been subjected to stress corrosion testing as specified in ISO 7866:1999.

~~m~~v) The interval between periodic inspections for steel cylinders may be extended to 15 years if approved by the appropriate national authority of the country of use.

Requirements for N.O.S. descriptions and for mixtures:

~~n~~z) The construction materials of the cylinders and their accessories must be compatible with the contents and must not react to form harmful or dangerous compounds therewith.

The test pressure and filling ratio must be calculated in accordance with the relevant requirements of (PI 200).

The necessary steps must be taken to prevent dangerous reactions (i.e. polymerization or decomposition) during transport. If necessary, stabilization or addition of an inhibitor must be required.

Note.— For the carriage of oxygen to provide life support to aquatic animals, see Note 7 of the Introductory Notes to this Part.

Table 1. COMPRESSED GASES

UN No.	Name and description	Class or Division	Subsidiary risk	LC_{50} ml/m^3	Cylinders	Test Period, years	Test pressure, bar*	Maximum ~~W~~working pressure, bar*	Special packing provisions*
1002	**Air, compressed**	2.2			X	10			
1006	**Argon, compressed**	2.2			X	10			
~~1014~~	~~**Carbon dioxide and oxygen mixture, compressed**~~	~~2.2~~	~~5.1~~		~~X~~	~~10~~			
~~≠~~ ~~1016~~	~~**Carbon monoxide, compressed**~~	~~2.3~~	~~2.1~~	~~3760~~	~~X~~	~~5~~			~~1~~
~~1023~~	~~**Coal gas, compressed**~~	~~2.3~~	~~2.1~~		~~X~~	~~5~~			
1046	**Helium, compressed**	2.2			X	10			
1049	**Hydrogen, compressed**	2.1			X	10			d
1056	**Krypton, compressed**	2.2			X	10			
1065	**Neon, compressed**	2.2			X	10			

1066	**Nitrogen, compressed**	2.2			X	10			
1071	**Oil gas, compressed**	2.3	2.1		X	5			
1072	**Oxygen, compressed**	2.2	5.1		X	10			~~k~~s
1954	**Compressed gas, flammable, n.o.s.**	2.1			X	10			~~n~~z
1956	**Compressed gas, n.o.s.**	2.2			X	10			~~n~~z
1957	**Deuterium, compressed**	2.1			X	10			d
1964	**Hydrocarbon gas mixture, compressed, n.o.s.**	2.1			X	10			~~n~~z
1971	**Methane, compressed or natural gas, compressed** with high methane content	2.1			X	10			
~~1979~~	~~**Rare gases mixture, compressed**~~	~~2.2~~			~~X~~	~~10~~			
~~1980~~	~~**Rare gases and oxygen mixture, compressed**~~	~~2.2~~			~~X~~	~~10~~			
~~1981~~	~~**Rare gases and nitrogen mixture, compressed**~~	~~2.2~~			~~X~~	~~10~~			
2034	**Hydrogen and methane mixture, compressed**	2.1			X	10			
3156	**Compressed gas, oxidizing, n.o.s.**	2.2	5.1		X	10			

* Where the entries are blank, the working pressure must not exceed two-thirds of the test pressure.

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
≠	1001	**Acetylene, dissolved**	2.1			X	10	60 52		c, ~~i~~p
	~~1005~~	~~**Ammonia, anhydrous**~~	~~2.3~~	~~8~~	~~4000~~	~~X~~	~~5~~	~~33~~	~~0.53~~	~~b~~
	1009	**Bromotrifluoromethane (refrigerant gas R 13b1)**	2.2			X	10	42 120 250	1.13 1.44 1.60	
	1010	**Butadienes, stabilized** (1,2-butadiene)	2.1			X	10	10	0.59	
	1010	**Butadienes, stabilized** (1,3-butadiene)	2.1			X	10	10	0.55	~~n~~z
≠	1010	**Butadienes and hydrocarbon mixture, stabilized** containing more than 40% butadienes	2.1			X	10			~~m~~v ~~n~~z
≠	1011	**Butane**	2.1			X	10	10	0.51	~~m~~v
≠	1012	**Butylene** (butylenes mixture)	2.1			X	10	10	0.50	~~n~~z
	1012	**Butylene** (1-butylene)	2.1			X	10	10	0.53	
	1012	**Butylene** (cis-2-butylene)	2.1			X	10	10	0.55	
	1013	**Carbon dioxide**	2.2			X	10	190 250	0.66 0.75	

	~~1015~~	~~**Carbon dioxide and nitrous oxide mixture**~~	~~2.2~~			~~X~~	~~10~~	~~250~~	~~0.75~~	
	1018	**Chlorodifluoromethane (refrigerant gas R 22)**	2.2			X	10	29	1.03	
	1020	**Chloropentafluoroethane (refrigerant gas R 115)**	2.2			X	10	25	1.08	
	1021	**1-Chloro-1,2,2,2-tetrafluoroethane (refrigerant gas R 124)**	2.2			X	10	12	1.20	
	1022	**Chlorotrifluoromethane (refrigerant gas R 13)**	2.2			X	10	100 120 190 250	0.83 0.90 1.04 1.10	
	1027	**Cyclopropane**	2.1			X	10	20	0.53	
	1028	**Dichlorodifluoromethane (refrigerant gas R 12)**	2.2			X	10	18	1.15	
	1029	**Dichlorofluoromethane (refrigerant gas R 21)**	2.2			X	10	10	1.23	
	1030	**1,1-Difluoroethane (Refrigerant gas R 152 a)**	2.1			X	10	18	0.79	
	1032	**Dimethylamine, anhydrous**	2.1			X	10	10	0.59	b
	1033	**Dimethyl ether**	2.1			X	10	18	0.58	
	1035	**Ethane**	2.1			X	10	95 120 300	0.25 0.29 0.39	
	1036	**Ethylamine**	2.1			X	10	10	0.61	b
≠	1037	**Ethyl chloride**	2.1			X	10	10	0.80	a, ~~j~~r
	1039	**Ethyl methyl ether**	2.1			X	10	10	0.64	
~~≠~~	~~1040~~	~~**Ethylene oxide, or ethylene oxide with nitrogen** up to a total pressure of 1mpa (10 bar) at 50°c~~	~~2.3~~	~~2.1~~	~~2900*~~	~~X~~	~~5~~	~~15~~	~~0.78~~	~~e~~
	1041	**Ethylene oxide and carbon dioxide mixture** with more than 9% ethylene oxide but not more than 87%	2.1			X	10	190 250	0.66 0.75	
≠	1043	**Fertilizer ammoniating solution** with free ammonia	2.2			X	5			b, ~~n~~z
	~~1048~~	~~**Hydrogen bromide, anhydrous**~~	~~2.3~~	~~8~~	~~2860~~	~~X~~	~~5~~	~~60~~	~~1.54~~	~~a, d~~
	1055	**Isobutylene**	2.1			X	10	10	0.52	
	1058	**Liquefied gases,** non-flammable, charged with nitrogen, carbon dioxide or air	2.2			X	10	Test pressure = 1.5 × working pressure		
≠	1060	**Methylacetylene and propadiene mixture, stabilized or**	2.1			X	10			c, ~~n~~z
≠	1060	**Methylacetylene and propadiene mixture, stabilized** (propadiene with 1% to 4% methylacetylene)	2.1			X	10	22	0.52	c
	1061	**Methylamine, anhydrous**	2.1			X	10	13	0.58	b

	1063	**Methyl chloride (refrigerant gas R 40)**	2.1			X	10	17	0.81	a
≠	~~1064~~	~~**Methyl mercaptan**~~	~~2.3~~	~~2.1~~	~~1350~~	~~X~~	~~5~~	~~10~~	~~0.78~~	~~d, l~~
	1070	**Nitrous oxide**	2.2	5.1		X	10	180 225 250	0.68 0.74 0.75	
≠	1075	**Petroleum gases, liquefied**	2.1			X	10			~~m~~v, ~~n~~z
	1077	**Propylene**	2.1			X	10	30	0.43	
≠	1078	**Refrigerant gas, n.o.s.**	2.2			X	10			~~n~~z
	~~1079~~	~~**Sulphur dioxide**~~	~~2.3~~	~~8~~	~~2520~~	~~X~~	~~5~~	~~14~~	~~1.23~~	
	1080	**Sulphur hexafluoride**	2.2			X	10	70 140 160	1.04 1.33 1.37	
≠	1081	**Tetrafluoroethylene, stabilized**	2.1			X	10	200		~~f~~m, ~~h~~o
	1083	**Trimethylamine, anhydrous**	2.1			X	10	10	0.56	b
	1085	**Vinyl bromide, stabilized**	2.1			X	10	10	1.37	a
	1086	**Vinyl chloride, stabilized**	2.1			X	10	12	0.81	a
	1087	**Vinyl methyl ether, stabilized**	2.1			X	10	10	0.67	
	1858	**Hexafluoropropylene (refrigerant gas R 1216)**	2.2			X	10	22	1.11	
	1860	**Vinyl fluoride, stabilized**	2.1			X	10	250	0.64	a
	1912	**Methyl chloride and methylene chloride mixture**	2.1			X	10	17	0.81	a
	1952	**Ethylene oxide and carbon dioxide mixture** with not more than 9% ethylene oxide	2.2			X	10	190 250	0.66 0.75	
	1958	**1,2-dichloro-1,1,2,2-tetrafluoroethane (refrigerant gas R 114)**	2.2			X	10	10	1.30	
	1959	**1,1-difluoroethylene (refrigerant gas R 1132a)**	2.1			X	10	250	0.77	
	1962	**Ethylene**	2.1			X	10	225 300	0.34 0.37	
≠	1965	**Hydrocarbon gas mixture, liquefied, n.o.s.**	2.1			X	10			~~m~~v, ~~n~~z
≠	1968	**Insecticide gas, n.o.s.**	2.2			X	10			~~n~~z
≠	1969	**Isobutane**	2.1			X	10	10	0.49	~~m~~v
	1973	**Chlorodifluoromethane and chloropentafluoroethane mixture** with fixed boiling point, with approximately 49% chlorodifluoromethane **(refrigerant gas R 502)**	2.2			X	10	31	1.05	
	1974	**Chlorodifluorobromo-methane (refrigerant gas R 12b1)**	2.2			X	10	10	1.61	

	1976	**Octafluorocyclobutane (refrigerant gas R C318)**	2.2			X	10	11	1.34	
≠	1978	**Propane**	2.1			X	10	25	0.42	~~m~~v
	1982	**Tetrafluoromethane (refrigerant gas R 14)**	2.2			X	10	200 300	0.62 0.94	
	1983	**1-chloro-2,2,2-trifluoroethane (refrigerant gas R 133a)**	2.2			X	10	10	1.18	
	1984	**Trifluoromethane (refrigerant gas R 23)**	2.2			X	10	190 250	0.87 0.95	
	2035	**1,1,1-trifluoroethane (refrigerant gas R 143a)**	2.1			X	10	35	0.75	
	2036	**Xenon**	2.2			X	10	130	1.24	
	2044	**2,2-dimethylpropane**	2.1			X	10	10	0.53	
	2073	**Ammonia solution,** relative density less than 0.880 at 15°C in water, with more than 35% but not more than 40% ammonia with more than 40% but not more than 50% ammonia	2.2			 X X	 5 5	 10 12	 0.80 0.77	 b b
≠	~~2191~~	~~**Sulphuryl fluoride**~~	~~2.3~~		~~3020~~	~~X~~	~~5~~	~~50~~	~~1.10~~	~~1~~
	2193	**Hexafluoroethane (refrigerant gas R 116)**	2.2			X	10	200	1.10	
	2200	**Propadiene, stabilized**	2.1			X	10	22	0.50	
≠	~~2204~~	~~**Carbonyl sulphide**~~	~~2.3~~	~~2.1~~	~~1700~~	~~X~~	~~5~~	~~26~~	~~0.84~~	~~1~~
	2419	**Bromotrifluoroethylene**	2.1			X	10	10	1.19	
	2422	**Octafluorobut-2-ene (refrigerant gas R 1318)**	2.2			X	10	12	1.34	
	2424	**Octafluoropropane (refrigerant gas R 218)**	2.2			X	10	25	1.09	
	2451	**Nitrogen trifluoride**	2.2	5.1		X	10	200 ~~300~~	0.50 ~~0.75~~	
	2452	**Ethylacetylene, stabilized**	2.1			X	10	10	0.57	c
	2453	**Ethyl fluoride (refrigerant gas R 161)**	2.1			X	10	30	0.57	
	2454	**Methyl fluoride (refrigerant gas R 41)**	2.1			X	10	300	0.36	
	2517	**1-chloro-1,1-difluoroethane (refrigerant gas R 142b)**	2.1			X	10	10	0.99	
	2599	**Chlorotrifluoromethane and trifluoromethane azeotropic mixture** with approximately 60% chlorotrifluoromethane (refrigerant gas R 503)	2.2			X	10	31 42 100	0.11 0.20 0.66	
	2601	**Cyclobutane**	2.1			X	10	10	0.63	

	2602	**Dichlorodifluoro-methane and difluoroethane azeotropic mixture** with approximately 74% dichlorodifluoromethane (refrigerant gas R 500)	2.2			X	10	22	1.01	
	3070	**Ethylene oxide and dichlorodifluoro-methane mixture** with not more than 12.5% ethylene oxide	2.2			X	10	18	1.09	
	3153	**Perfluoro(methyl vinyl ether)**	2.1			X	10	20	0.75	
	3154	**Perfluoro(ethyl vinyl ether)**	2.1			X	10	10	0.98	
≠	3157	**Liquefied gas, oxidizing, n.o.s.**	2.2	5.1		X	10			~~n~~z
	3159	**1,1,1,2-tetrafluoroethane (refrigerant gas R 134a)**	2.2			X	10	22	1.04	
≠	3161	**Liquefied gas, flammable, n.o.s.**	2.1			X	10			~~n~~z
≠	3163	**Liquefied gas, n.o.s.**	2.2			X	10			~~n~~z
	3220	**Pentafluoroethane (refrigerant gas R 125)**	2.2			X	10	49 36	0.95 0.72	
	3252	**Difluoromethane (refrigerant gas R 32)**	2.1			X	10	48	0.78	
	3296	**Heptafluoropropane (refrigerant gas R 227)**	2.2			X	10	15	1.20	
	3297	**Ethylene oxide and chlorotetrafluoroethane mixture** with not more than 8.8% ethylene oxide	2.2			X	10	10	1.16	
	3298	**Ethylene oxide and pentafluoroethane mixture** with not more than 7.9% ethylene oxide	2.2			X	10	26	1.02	
	3299	**Ethylene oxide and tetrafluoroethane mixture** with not more than 5.6% ethylene oxide	2.2			X	10	17	1.03	
~~≠~~	~~3300~~	~~**Ethylene oxide and carbon dioxide mixture** with more than 87% ethylene oxide~~	~~2.3~~	~~2.1~~	~~More than 2900~~	~~X~~	~~5~~	~~28~~	~~0.73~~	
~~≠~~	~~3318~~	~~**Ammonia solution,** relative density less than 0.880 at 15ºC in water, with more than 50% ammonia~~	~~2.3~~	~~8~~		~~X~~	~~5~~			~~b~~
	3337	**Refrigerant gas R 404a**	2.2			X	10	36	0.82	
	3338	**Refrigerant gas R 407a**	2.2			X	10	36	0.94	
	3339	**Refrigerant gas R 407b**	2.2			X	10	38	0.93	
	3340	**Refrigerant gas R 407c**	2.2			X	10	35	0.95	
≠	3354		2.1			X	10			~~n~~z
≠	3374	**Acetylene, solvent free**	2.1			X	5	60 52		c, ~~i~~p

. . .

Replace Packing Instruction 202 with the following:

202	PACKING INSTRUCTION 202	202

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

Open cryogenic receptacles

Open cryogenic receptacles must be metal vacuum insulated vessels or flasks vented to the atmosphere to prevent any increase in pressure within the package. The use of safety relief valves, check valves, frangible discs or similar devices in the vent lines is not permitted. Fill and discharge openings must be protected against the entry of foreign materials which might increase the internal pressure. The maximum water capacity is 50 litres. The open receptacle must have a secure base and must be designed so that it will remain stable and will not topple under normal conditions of transport.

Open cryogenic receptacles are permitted for Nitrogen, Argon, Krypton and Xenon refrigerated liquids.

Closed cryogenic receptacles

For closed cryogenic receptacles, the general requirements of Part 4, Chapter 1 and Chapter 4 must be met.

Closed cryogenic receptacles constructed as specified in Part 6, Chapter 5 are authorized for the transport of refrigerated liquefied gases.

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. 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. Degree of filling

For 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.

3. Pressure-relief devices

Every closed cryogenic receptacle, having a nominal capacity in excess of 550 L, must be provided with at least two 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 one 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 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.

4. 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 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.

203 PACKING INSTRUCTION 203 203

This instruction applies to UN 1950 and 2037.

The general packing requirements of Part 4, Chapter 1 must be met.

Single packagings are not permitted.

~~Aerosol products are permitted in inner non-refillable non-metal receptacles not exceeding 120 mL capacity each.~~

METAL AEROSOLS AND NON-REFILLABLE RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)

~~Aerosols and receptacles, containing gas (gas cartridges) are permitted in inner n~~Non-refillable metal aerosols and non-refillable receptacles ~~not exceeding~~ containing gas (gas cartridges) must not exceed 1 000 mL capacity ~~each~~.

The following conditions must be met ~~for both metallic and non-metallic receptacles~~:

a) the pressure in the receptacle 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;

b) if the pressure in the receptacle exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;

c) if the pressure in the receptacle 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;

d) if the pressure in the receptacle exceeds 1 245 kPa at 55°C, an IP.7B metal receptacle must be used;

e) 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 a), b), c) or d) above do not apply to the pressure within the capsule for an aerosol. 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 the outer metal receptacle;

f) the liquid content must not completely fill the closed receptacle at 55°C;

g) each receptacle exceeding 120 mL capacity must have been heated until the pressure in the receptacle is equivalent to the equilibrium pressure of the contents at 55°C, without evidence of leakage, distortion or other defect~~;~~.

~~h) the valves, if fitted, must be protected by a cap or other suitable means during transport;~~

~~i) receptacles must be tightly packed, so as to prevent movement, in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II.~~

PLASTIC AEROSOLS (IP.7C)

Non-refillable plastic aerosols must not exceed:

(i) 500 mL capacity when containing non-flammable non-toxic gas and contents; or

(ii) 120 mL capacity when containing flammable and/or toxic gas and contents.

The following conditions must be met:

a) the contents must not completely fill the closed receptacle at 55°C;

b) the pressure in the container may not exceed 970 kPa at 55°C; and

c) each receptacle must be leak tested in accordance with the provisions of 6;3.2.8.1.6.

ALL AEROSOLS

a) the valves, if fitted, must be protected by a cap or other suitable means during transport;

b) receptacles must be tightly packed, so as to prevent movement, in wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G) or plastic boxes (4H1, 4H2) of Packing Group II.

Y203 PACKING INSTRUCTION Y203 Y203

This instruction applies to UN 1950 and 2037.

The requirements of Part 3, Chapter 4 must be met.

Single packagings are not permitted.

COMBINATION PACKAGINGS:

INNER:

~~Aerosol products are permitted in inner non-refillable non-metal receptacles not exceeding 120 mL capacity each. Aerosols and receptacles containing gas (gas cartridges) are not permitted in inner non-refillable metal receptacles not exceeding 1 000 mL capacity each when containing a non-toxic substance. The following conditions must be for both metallic and non-metallic receptacles:~~

METAL AEROSOLS AND NON-REFILLABLE RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)

Non-refillable metal aerosols and non-refillable receptacles, containing gas (gas cartridges) must not exceed 1000 mL capacity.

a) the pressure in the receptacle must not exceed 1 245 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;

b) if the pressure in the receptacle exceeds 970 kPa at 55°C but does not exceed 1 105 kPa at 55°C, an IP.7, IP.7A or IP.7B metal receptacle must be used;

c) if the pressure in the receptacle exceeds 1 105 kPa at 55°C, an IP.7A or IP.7B metal receptacle must be used;

d) if the pressure in the receptacle exceeds 1245 kPa at 55°C, an IP.7B metal receptacle must be used;

e) 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 a), b), c) or ~~c~~d) above do not apply to the pressure within the capsule for an aerosol. 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 the outer metal receptacle;

~~e~~f) the liquid content must not completely fill the closed receptacle at 55°C;

~~f~~g) each receptacle 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~~:~~.

~~g) the valves, if fitted, must be protected by a cap or other suitable means during transport;~~

~~h) each receptacle must be tightly packed, so as to prevent movement, in one of the following boxes:~~

PLASTIC AEROSOLS (IP.7C)

Non-refillable plastic aerosols must not exceed:

(i) 500 mL capacity when containing non flammable non toxic gas and contents; or

(ii) 120 mL capacity when containing flammable and/or toxic gas and contents.

The following conditions must be met:

a) the contents must not completely fill the closed receptacle at 55°C

b) the pressure in the container may not exceed 970 kPa at 55°C

c) each receptacle must be leak tested in accordance with the provisions of Part 6:3.2.8.1.6.

ALL AEROSOLS

a) the valves, if fitted, must be protected by a cap or other suitable means during transport;

b) receptacles must be tightly packed, so as to prevent movement, in

OUTER:

Boxes
Fibreboard
Plastic
Plywood
Reconstituted wood
Wooden

. . .

214 PACKING INSTRUCTION 214 214

This instruction applies to storage systems containing hydrogen absorbed in a metal hydride (UN3468) 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 IEC PAS 62282-6-1, Annex B.

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.

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.

Chapter 5
CLASS 3 — FLAMMABLE LIQUID

Secretarial Note.—

Amend Packing Instructions 303, 309 and 310 as follows:

"Cylinders that meet the requirements of ~~PI200~~ 4;2.7 are permitted"

Amend Packing Instruction 307 as follows:

"Cylinders as permitted by ~~PI 200~~ 4;2.7"

Amend, under single packagings, Packing Instruction 304 and 308 as follows:

Cylinders (as permitted by ~~PI 200~~ 4;2.7)

Amend Packing Instructions 304 and 306 as follows:

"8 Only metal cylinders that meet the requirements of ~~P200~~ 4;2.7 are permitted"

Delete UN 1162 and UN 2985 from Packing Instruction Y305

Delete UN 1196 and UN 1298 from Packing Instruction Y306

Add UN 3469 to Packing Instructions Y305 and Y309

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313	PACKING INSTRUCTION 313	313

This instruction applies to UN3473 on passenger and cargo aircraft.

Fuel cell cartridges containing flammable liquid must be packed in accordance with the general packing requirements of Part 4, Chapter 1 and be in wooden (4C1, 4C2), plywood (4D), fibreboard (4G) or reconstituted wood (4F) boxes, plywood drums (1D), fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2) or solid plastic boxes (4H2) of Packing Group II. The fuel cells must be incapable of short-circuiting and be securely cushioned in the packagings.

If fuel cell cartridges are shipped as an integral component of assembled equipment, they must be securely installed and protected against contact with other articles so as to prevent short circuits.

When fuel cell cartridges are packed with equipment, they must be packed in inner packagings or placed in the outer packaging with cushioning material so that the cartridges are protected against damage that may be caused by the movement or placement of the equipment and the cartridges within the outer packaging.

Chapter 6
CLASS 4 — FLAMMABLE SOLIDS; SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION; SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES

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Secretarial Note.—

Amend Packing Instructions 409, 431 and 432 as indicated below.

"8 "Only metal cylinders that meet the requirements of ~~P200~~ 4;2.7 are permitted"

Amend, under single packagings, Packing Instruction 432 as follows:

Cylinders (as permitted by ~~PI 200~~ 4;2.7)

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Chapter 8
CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

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Secretarial Note.—

Amend Packing Instructions 611, 618 and 620 as follows:

"Cylinders that meet the requirements of ~~PI200~~ 4;2.7 are permitted"

Amend Packing Instructions 604, 605 and 612 as follows:

"Cylinders as permitted by ~~PI 200~~ 4;2.7"

Amend Packing Instruction 605 as follows:

"8 "Only metal cylinders that meet the requirements of ~~P200~~ 4;2.7 are permitted"

Delete UN 1737 and UN1738 from Packing Instruction Y610

Delete UN 3361 and UN 3362 from Packing Instruction Y609

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602	PACKING INSTRUCTION 602	602

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Note.— The capability of a packaging to withstand an internal pressure without leakage that produces the specified pressure differential should be determined by testing samples of primary receptacles or secondary packagings. Pressure differential is the difference between the pressure exerted on the inside of the receptacle or packaging and the pressure on the outside. The appropriate test method should be selected based on receptacle or packaging type. Acceptable test methods include any method that produces the required pressure differential between the inside and outside of a primary receptacle or a secondary packaging. The test may be conducted using internal hydraulic or pneumatic pressure (gauge) or external vacuum test methods. Internal hydraulic or pneumatic pressure can be applied in most cases as the required pressure differential can be achieved under most circumstances. An external vacuum test is not acceptable if the specified pressure differential is not achieved and maintained. The external vacuum test is a

generally acceptable method for rigid receptacles and packagings but is not normally acceptable for

— flexible receptacles and flexible packagings,

— receptacles and packagings filled and closed under a absolute atmospheric pressure lower than 95 kPa

Special packing provisions

1) Shippers of infectious substances must ensure that packages are prepared in such a manner that they arrive at their destination in good condition and present no hazard to persons or animals during transport.

2) The definition in Part 1, Chapter 3, and the general packing provision of Part 4, Chapter 1, apply to infectious substances packages.

3) An itemized list of contents must be enclosed between the secondary packaging and the outer packaging. When the infectious substances to be transported are unknown, but suspected of meeting the criteria for inclusion in Category A and assignment to UN 2814 or UN 2900, the words "suspected Category A infectious substance" must be shown in parentheses following the proper shipping name on the itemized list of contents inside the outer packaging.

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650 PACKING INSTRUCTION 650 650

This packing instruction applies to UN 3373.

1) The packaging must be of good quality, strong enough to withstand the shocks and loadings normally encountered during transport, including transhipment between transport units and between transport units and warehouses as well as any removal from a pallet or overpack for subsequent manual or mechanical handling. Packagings must be constructed and closed to prevent any loss of contents that might be caused under normal conditions of transport by vibration or by changes in temperature, humidity or pressure.

2) The packaging must consist of three components:

   a) a primary receptacle;

   b) a secondary packaging; and

   c) a rigid outer packaging.

3) Primary receptacles must be packed in secondary packagings in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the secondary packaging. Secondary packagings must be secured in outer packagings with suitable cushioning material. Any leakage of the contents must not compromise the integrity of the cushioning material or of the outer packaging.

4) 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. The proper shipping name ~~"Diagnostic specimen", "Clinical specimen" or~~ "Biological substance, Category B" in letters at least 6 mm high must be marked on the outer package adjacent to the diamond-shaped mark.

. . .

6) The completed package must be capable of successfully passing the drop test in 6;6.2 as specified in 6;6.1.5 of the Instructions except that the height of the drop must not be less than 1.2 m. Following the appropriate drop sequence, there must be no leakage from the primary receptacle(s) which must remain protected by absorbent material, when required, in the secondary packaging.

7) For liquid substances:

a) The primary receptacle(s) must be leakproof and must not contain more than 1 litre;

b) The secondary packaging must be leakproof;

c) If multiple fragile primary receptacles are placed in a single secondary packaging, they must be either individually wrapped or separated to prevent contact between them;

d) Absorbent material must be placed between the primary receptacle(s) and the secondary packaging. The absorbent material must be in 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;

e) The primary receptacle or the secondary packaging must be capable of withstanding, without leakage, an internal pressure of 95 kPa (0.95 bar);

f) The outer package must not contain more than 4 litres. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold.

Note.— The capability of a packaging to withstand an internal pressure without leakage that produces the specified pressure differential should be determined by testing samples of primary receptacles or secondary packagings. Pressure differential is the difference between the pressure exerted on the inside of the receptacle or packaging and the pressure on the outside. The appropriate test method should be selected based on receptacle or packaging type. Acceptable test methods include any method that produces the required pressure differential between the inside and outside of a primary receptacle or a secondary packaging. The test may be conducted using internal hydraulic or pneumatic pressure (gauge) or external vacuum test methods. Internal hydraulic or pneumatic pressure can be applied in most cases as the required pressure differential can be achieved under most circumstances. An external vacuum test is not acceptable if the specified pressure differential is not achieved and maintained. The external vacuum test is a generally acceptable method for rigid receptacles and packagings but is not normally acceptable for

— flexible receptacles and flexible packagings,

— receptacles and packagings filled and closed under a absolute atmospheric pressure lower than 95 kPa

. . .

10) When packages are placed in an overpack, the package markings required by this packing instruction must either be clearly visible or the markings must be reproduced on the outside of the overpack and the overpack must be marked with the word "Overpack".

11) Infectious substances assigned to UN 3373 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:

a) the name and address of the shipper and of the consignee must be provided on each package;

~~a~~b) the proper shipping name, UN number and the name~~, address~~ and telephone number of a person responsible must be provided on a written document (such as an air waybill) or on the package;

~~b~~c) classification must be in accordance with 2;6.3.2;

~~c~~d) the incident reporting requirements in 7;4.4 must be met; and

~~d~~e) the inspection for damage or leakage requirements in 7;3.1.3 and 7;3.1.4;

~~e~~f) passengers and crew members are prohibited from transporting infectious substances either as, or in, carry-on baggage or checked baggage or on their person.

Note.— When the shipper or consignee is also the 'person responsible' as referred to in b) above, the name and address need be marked only once in order to satisfy the name and address marking provisions in both a) and b), above.

. . .

13) 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 Classes 3, 8 or 9 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 1;2.4.2 and 1;2.4.3. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction no other requirements in these Instructions need be met.

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Chapter 10
CLASS 8 — CORROSIVES

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Secretarial Note.—

Amend Packing Instructions 812 and 820 as follows:

"Cylinders that meet the requirements of ~~PI200~~ 4;2.7 are permitted"

Amend Packing Instructions 813 and 821 as follows:

"Cylinders as permitted by ~~PI 200~~ 4;2.7"

Replace UN 1740 with UN 3471 in Packing Instructions 809, Y809, 813, 819, Y819 and 821

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Chapter 11
CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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Secretarial Note.— Amend Packing Instruction 914 as follows:

"Cylinders that meet the requirements of ~~PI200~~ 4;2.7 are permitted"

900	PACKING INSTRUCTION 900	900

Vehicles, machines or equipment containing internal combustion engines or batteries must meet the following requirements:

. . .

b) 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 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 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 ~~between the pressure receptacle and the shut-off valve shall the pressure~~ exceed ~~more than~~ 5% of the maximum allowable working pressure of the system, or more than 2000 kPa (20 bar), whichever is the lower;

iv) there must not be any residual liquefied gas in the system, including the fuel tank;

. . .

f) in the event that vehicles, machines or equipment containing internal combustion engines are being shipped in a dismantled state such that fuel lines have been disconnected, those fuel lines must be sealed securely;

~~g) when internal combustion 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 leak-proof caps, which are positively retained;~~

~~h~~g) vehicles equipped with theft-protection devices, installed radio communications equipment or navigational system must have such devices, equipment or system disabled;

~~i~~h) 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, 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

~~j~~i) if sodium batteries are installed they must conform to the requirements of special provision A94, 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.

When internal combustion 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 leak-proof caps, which are positively retained

Replacements for the dangerous goods permitted in paragraphs a) to ~~j~~i) must not be carried under this packing instruction.

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903	PACKING INSTRUCTION 903	903

The general packing requirements of Part 4, Chapter 1 must be met.

This entry applies to cells and batteries containing lithium in any form, including lithium polymer and lithium ion cells and batteries.

Lithium cells and batteries may only be transported under this Packing Instruction if they meet the following requirements:

a) each cell or battery type has been determined to meet the criteria for assignment to Class 9 on the basis of tests carried out in accordance with the *Manual of Tests and Criteria*, Part III, subsection 38.3;

b) each cell and battery must incorporate a safety venting device or be designed to preclude a violent rupture under conditions normally incident to transport;

c) each cell and battery must be equipped with an effective means of preventing external short circuits;

d) each battery containing cells or 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, etc.);

e) cells and batteries must be packed in the inner packagings to effectively prevent short circuits and to prevent movement which could lead to short circuits;

f) cells and batteries must be packed in steel drums (1A2), aluminium drums (1B2), plywood drums (1D) or fibre drums (1G), plastic drums (1H2), plastic jerricans (3H2), steel jerricans (3A2), wooden boxes (4C1, 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fibreboard boxes (4G), solid plastic boxes (4H2), steel or aluminium boxes (4A, 4B) of Packing Group II;

g) irrespective of the requirements in e) and f) above, 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.

Cells ~~assigned to Class 9~~ 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) 2 volts; or

b) two-thirds of the voltage of the undischarged cell;

and batteries containing one or more cells, are forbidden from transport.

904 PACKING INSTRUCTION 904 904

≠ Solid carbon dioxide (dry ice) in packages when offered for transport by air must be packed in accordance with the general packing requirements of Part 4, Chapter 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. Arrangements between shipper and operator(s) must be made for each shipment, to ensure that ventilation safety procedures are followed. The dangerous goods transport document requirements of Part 5, Chapter 1 are not applicable provided alternative written documentation is supplied containing the following information: proper shipping name (**Dry ice** or **Carbon dioxide, solid**), class 9, UN number 1845, the number of packages and the net quantity of dry ice in each package. The information must be included with the description of the goods. The net mass of the **Carbon dioxide, solid** (**Dry ice**) must be marked on the outside of the package.

Dry ice used as a refrigerant 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 the shipper has made prior arrangements with the operator. In such case, 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 shipper must provide the operator with written documentation stating the total quantity of the dry ice contained in the unit load device or other type of pallet.

Note.— For loading restrictions see 7;2.11; for special marking requirement see 5;2.4.7.

905 PACKING INSTRUCTION 905 905

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, in cylinders that conform to the requirements of Packing Instruction 200; these may be connected to the life-saving appliance. 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 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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911	PACKING INSTRUCTION 911	911

The general packing requirements of Part 4, Chapter 1 must be met.

COMBINATION PACKAGINGS:

INNER:

Glass or earthenware (IP.1)	~~5~~10 kg
Plastic (IP.2)	~~10~~50 kg
Metal (IP.3, IP.3A)	~~10~~50 kg
Paper (IP.4)	~~5~~50 kg
Plastic bag (IP.5)	~~5~~50 kg
Fibre (IP.6)	~~5~~50 kg
Glass ampoule (IP.8)	0.5 kg
Paper, plastic/aluminium (IP.10)	5 kg

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Y911	PACKING INSTRUCTION Y911	Y911

The requirements of Part 3, Chapter 4 must be met.

Single packagings are not permitted.

COMBINATION PACKAGINGS:

INNER:

Glass or earthenware (IP.1)	~~1~~5 kg
Plastic (IP.2)	~~2~~5 kg
Metal (IP.3, IP.3A)	~~2~~5 kg
Paper (IP.4)	~~1~~5 kg
Plastic bag (IP.5)	~~1~~5 kg
Fibre (IP.6)	~~1~~5 kg
Glass ampoule (IP.8)	0.5 kg
Paper, plastic/aluminium (IP.10)	~~1~~5 kg

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914	PACKING INSTRUCTION 914	914

The general packing requirements of Part 4, Chapter 1 must be met.

COMBINATION PACKAGINGS:

INNER:

Glass or earthenware (IP.1)	~~5~~10 L
Plastic (IP.2)	~~5~~30 L
Metal (IP.3, IP.3A)	~~10~~40 L
Glass ampoule (IP.8)	0.5 L

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Y914	PACKING INSTRUCTION Y914	Y914

The requirements of Part 3, Chapter 4 must be met.

Single packagings are not permitted.

COMBINATION PACKAGINGS:

INNER:

Glass or earthenware (IP.1)	~~1~~5 L
Plastic (IP.2)	~~1~~5 L
Metal (IP.3, IP.3A)	~~2~~5 L
Glass ampoule (IP.8)	0.5 L

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Part 5
SHIPPER'S RESPONSIBILITIES

Chapter 1
GENERAL

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1.1 GENERAL REQUIREMENTS

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i) 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~~, with the approval of the operator,~~ magnetized material when prepared according to Packing Instruction 902);

1.2 GENERAL PROVISIONS FOR CLASS 7

1.2.1 Requirements before shipments

. . .

1.2.1.2 *Each shipment*

Before each shipment of any package, the following requirements must be fulfilled:

a) For any package it must be ensured that all the requirements specified in the relevant provisions of these Instructions have been satisfied;

b) It must be ensured that lifting attachments which do not meet the requirements of 6;7.1.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6;7.1.3;

c) For each package requiring competent authority approval~~Type B(U), Type B(M) and Type C package and for each package containing fissile material~~, it must be ensured that all the requirements specified in the approval certificates have been satisfied;

. . .

1.2.2 Approval of shipments and notification

. . .

1.2.2.2 *Shipment approvals*

Multilateral approval must be required for:

a) The shipment of Type B(M) packages not conforming with the requirements of 6;7.6.5;

b) The shipment of Type B(M) 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;

c) The shipment of packages containing fissile materials if the sum of the criticality safety indexes of the packages in a single freight container or in an aircraft exceeds 50; and

except that a competent authority may authorize transport into or through its country without shipment approval, by a specific provision in its design approval (see 1.2.3.1).

. . .

1.2.2.4 *Notifications*

Notification to competent authorities is required as follows:

. . .

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 in units of grams (g), or multiples thereof, may be used in place of activity.

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Chapter 2
PACKAGE MARKINGS

. . .

2.4 MARKING SPECIFICATIONS AND REQUIREMENTS

2.4.1 Marking with proper shipping name

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" 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") must be placed within a diamond. 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.

. . .

2.4.5 Special marking requirements for radioactive material

2.4.5.1

a) each package of gross mass exceeding 50 kg must have its permissible gross mass legibly and durably marked on the outside of the packaging;

b) each package which conforms to:

i) a Type IP-1 package, a Type IP-2 package or a Type IP-3 package design must be legibly and durably marked on the outside of the packaging with "TYPE IP-1", "TYPE IP-2" or "TYPE IP-3" as appropriate;

ii) a Type A package design must be legibly and durably marked on the outside of the packaging with "TYPE A";

iii) a Type IP-2 package, a Type IP-3 package or a Type A package design must be legibly and durably marked on the outside of the packaging with the international vehicle registration code (VRI Code) of the country of origin of design and either the name of the manufacturers, or other identification of the packaging specified by the competent authority of the country of origin of design.

. . .

2.4.5.2 In case of international transport of packages requiring competent authority design or shipment approval, for which different approval types apply in the different countries concerned, marking must be in accordance with the certificate of the country of origin of the design.

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2.4.9 Marking of overpacks

~~a)~~ An overpack must be marked with the word "Overpack", with the proper shipping name, UN number~~, "limited quantities" (when applicable)~~, and special handling instructions appearing on interior packages~~, and labelled, as required for packages by Chapter 3,~~ for each item of dangerous goods contained in the overpack unless markings and labels representative of all dangerous goods in the overpack are visible.

~~b) Where packages containing diagnostic specimens are placed in an overpack, the words "Diagnostic Specimens" appearing on the packages within must be clearly visible, or must be reproduced on the outside of the overpack.~~

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Chapter 3
LABELLING

. . .

3.1 THE REQUIREMENT TO LABEL

3.1.1 Where articles or substances are specifically listed in the Dangerous Goods List (Table 3-1), a danger class label must be affixed for the hazard shown in column 3 of Table 3-1 ~~and a~~. A subsidiary risk label must also be affixed for any risk indicated by a class or division number in column 4 of Table 3-1~~, unless qualified by a special provision. In certain cases, the need for using a subsidiary risk label may also be indicated by a special provision indicated in column 7 of Table 3-1.~~ However, special provisions indicated in column 7 may also require a subsidiary risk label where no subsidiary risk is indicated in column 4 or may exempt from the requirement for a subsidiary risk label where such a risk is indicated in the Dangerous Goods List.

3.1.2 Labels identifying the primary and subsidiary risks of the dangerous goods must bear the class or division number as required in 3.4.1.

3.1.3 All labels must be able to withstand open weather exposure without a substantial reduction in effectiveness.

. . .

3.2 APPLICATION OF LABELS

3.2.1 The labels required to be displayed on packages of dangerous goods are identified in the Dangerous Goods List for articles and substances specifically listed by name and for articles and substances not specifically listed by name which are covered by generic or n.o.s. entries. ~~Labels required on packages within an overpack must be clearly visible in accordance with the provisions of 3.2.7 and 3.2.11 a) or be reproduced on the outside of the overpack such that the provisions of those paragraphs would be met in regard to the locations of the labels on the overpack.~~

. . .

3.2.4 In addition to the primary hazard label (Figure 5-15), infectious substances packages must bear any other label required by the nature of the contents. This is not required if a quantity of 30 ml or less of dangerous goods included in classes 3, 8 or 9 is packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 1;2.4.2 and 1;2.4.3.

. . .

3.2.7 Except as provided in 3.4.1.1 d), each label must:

a) be affixed to a background of contrasting colour or must have a dotted or solid line outer boundary;

b) be located on the same surface of the package near the proper shipping name marking, if the package dimensions are adequate;

c) be so placed on the packaging that they are not covered or obscured by any part of or attachment to the packaging or any other label or marking; and

d) when primary and subsidiary risk labels are required, be displayed next to each other.

e) in case of hazard warning labels, be affixed at an angle of 45° (diamond shaped), unless the package dimensions are inadequate.

. . .

3.3 LABELLING OF OVERPACKS

3.3.1 An overpack must be labelled as required for packages by Chapter 3, for each item of dangerous goods contained in the overpack unless labels representative of all dangerous goods in the overpack are visible.

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 5-25), or pre-printed package orientation labels meeting the same specification as either Figure 5-25 or ISO Standard 780-1985, 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.

3.3~~3~~4 PROHIBITED LABELLING

Arrows for purposes other than indicating proper package orientation must not be displayed on a package containing liquid dangerous goods.

3.4~~3~~5 LABEL SPECIFICATIONS

3.4~~3~~5.1 Class hazard label specifications

3.4~~3~~5.1.1 Class hazard labels must conform to the following specifications:

. . .

Labelling of radioactive material

h) Each label conforming to Figures 5-~~16~~17, 5-~~17~~18 and 5-~~18~~19 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 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 3.4.1.1 g) 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: See 2;7.6.1.1 and 2;7.6.1.2. (No transport index entry is required for category I-WHITE.)

i) Each label conforming to the Figure 5-~~19~~20 must be completed with the criticality safety index (CSI) as stated in the certificate of approval for special arrangement or the certificate of approval for the package design issued by the competent authority.

j) For overpacks and freight containers, the criticality safety index (CSI) on the label must bear the information required in h) above totalled together for the fissile contents of the overpack or freight container.

k) In case of international transport of packages requiring competent authorities' design or shipment approval, for which different approval types apply in the different countries concerned, labelling must be in accordance with the certificate of the country of origin of design.

3.~~4~~5.1.2 Illustrations of the class hazard labels, showing the approved symbols and colours, are given in Figures 5-2 to 5-~~21~~22. The label descriptions used in column 5 of Table 3-1 are indicated in parentheses.

Note 1.— The asterisk appearing in the bottom corner of the label indicates the location of the class or division number when the label is used to show the primary risk. See Figures 5-2 to 5-5 concerning the location of information on explosives labels.

Note 2.— Minor variations in the design of the symbol on labels or other differences such as the width of vertical lines on labels as shown in these Instructions or in regulations of other modes, which do not affect the obvious meaning of the label, are acceptable. For example the hand shown on the Class 8 label may be shown with or without shading, the extreme right and left vertical lines on the Division 4.1 and Class 9 label may extend to the edge of the label or there may be some white space at the edge, etc.

. . .

(Oxidizer ~~or Organic peroxide~~)

Symbol (flame over circle): black
Background: yellow
Figure "5.1"in bottom corner

~~* Place for division number~~

Figure 5-13. Oxidizing substance ~~and organic peroxide~~, 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.

Insert new Figure 5-14:

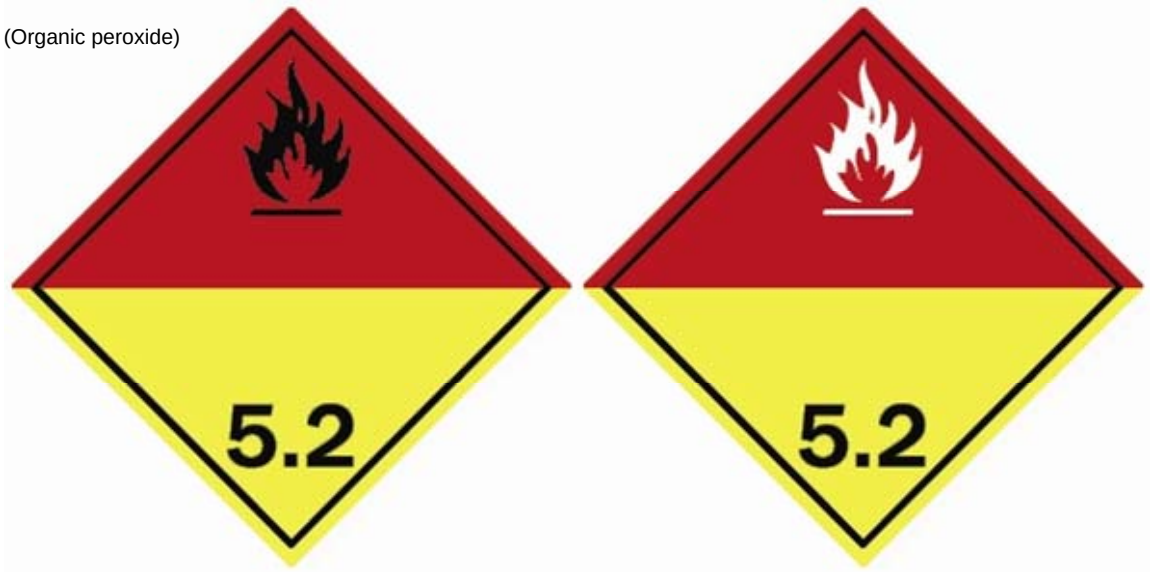

Figure 5-14. Organic peroxide, Class 5, Division 5.2

Renumber subsequent figures accordingly

Replace Figure 20 (now Figure 21) with the following (the hand symbol in the label which was originally shaded grey is now white):

(Corrosive)

Symbol (liquids spilling from two glass vessels and attacking a hand and a metal): black
Background: upper half white, lower half black with white border

* Place for class number

Figure 5-~~20~~21. Corrosive, Class 8

Replace Figure 21 (now Figure 22) with the following (the horizontal line which was under the vertical lines has been removed):

(Miscellaneous)

Symbol (seven vertical stripes in upper half): black
Background: white

Figure 5-~~21~~22. Miscellaneous dangerous goods, Class 9

. . .

Colour: red or black on a contrasting background
Dimensions: 74 × 105 mm

Note.— The words "The information for this package need not appear on the Notification to Captain (NOTOC)" are optional and may be included.

Figure 5-~~28~~29. Radioactive material, excepted package

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Chapter 4
DOCUMENTATION

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~~*Note 1.— In addition to the provisions of this section, other elements of information may be required by the appropriate national authority or for certain modes of transport (e.g. flashpoint or flashpoint range in °C).*~~

Note ~~2~~.— These Instructions do not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an aid to paper documentation, unless otherwise indicated.

. . .

4.1 DANGEROUS GOODS TRANSPORT DOCUMENTATION

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 number preceded by the letters "UN";

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. ~~Any assigned subsidiary hazard class or division number(s) must be entered following the numerical hazard class or division and must be enclosed in parenthesis.~~ The words "~~c~~Class" or "~~d~~Division" may be included preceding the primary ~~or subsidiary~~ 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;

~~d~~e) where assigned, the packing group for the substance or article which may be preceded by "PG" (e.g. "PG II").

4.1.4.2 *Sequence of the dangerous goods description*

4.1.4.2.1 The five elements of dangerous goods description specified in 4.1.4.1 must be shown in the order listed above ~~either in sequence a), b), c), d), or in sequence b), c), a), d)~~ (i.e. a), b), c), d), e)), with no information interspersed, except as provided in these Instructions. Examples of ~~such permitted~~ a dangerous goods description~~s~~ are:

"UN 1717 Acetyl chloride 3 (8) II" or
"UN 1717 Acetyl chloride, Class 3 (Class 8), ~~UN 1717,~~ PG II"

4.1.4.2.2 Alternatively, the dangerous goods transport document may contain the information for each item of dangerous goods in the following sequence:

a) the proper shipping name (supplemented with the technical name(s) if appropriate, see Part 3, Chapter 1);

b) class or when assigned, division (including for Class 1 the compatibility group);

c) UN number (if any) preceded by the letters "UN"; and

d) where assigned, the appropriate packing group shown in Table 3-1.

These four elements of the basic dangerous goods description must always be provided in the order given above with no additional information interspersed. Additionally, the subsidiary risk, when applicable, must be shown in the additional information. An example of a basic dangerous goods description is:

Acetyl chloride 3 UN 1717 II

~~*Note 1.— It is intended that from 1 January 2007, the use of the sequence in 4.1.4.2.2 will be deleted.*~~

Note ~~2~~1.— In addition to the requirements of these Instructions, other elements of information may be required by the appropriate national authority or for certain modes of transport (e.g. flash point for sea transport). Unless permitted or required by these Instructions, additional information must be placed after the dangerous goods description.

Note ~~3~~2.— Additional descriptive text in the entries in column 1 of the Dangerous Goods List (Table 3-1) are not part of the proper shipping name but may be used in addition to the proper shipping name.

Note ~~4~~3.— For explosives of Class 1, the basic dangerous goods description may be supplemented by additional descriptive text to indicate commercial or military names.

~~e) for chemical kits and first aid kits, the total net quantity of dangerous goods. The net mass of liquids within the kits is to be calculated on a 1 to 1 basis of their volume, i.e. 1 litre equal to 1 kilogram;~~

~~f) for dangerous goods in machinery or apparatus, the individual total quantities of dangerous goods in solid, liquid or gaseous state, contained in the article;~~

. . .

4.1.4.3 *Information which supplements the proper shipping name in the dangerous goods description*

a) 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;1.2.5;

. . .

~~e) for chemical kits and first aid kits, the total net quantity of dangerous goods. The net mass of liquids within the kits is to be calculated on a 1 to 1 basis of their volume, i.e. 1 litre equal to 1 kilogram;~~

~~f) for dangerous goods in machinery or apparatus, the individual total quantities of dangerous goods in solid, liquid or gaseous state, contained in the article.~~

4.1.5 Information required in addition to the dangerous goods description

In addition to the dangerous goods description the following information must be included after the dangerous goods description on the dangerous goods transport document.

4.1.5.1 ~~*Total quantity of dangerous goods*~~*Quantity of dangerous goods, number and type of packagings*

~~Except for empty uncleaned packagings, the total quantity of dangerous goods covered by the description (by volume or mass as appropriate) of each item of dangerous goods bearing a different proper shipping name, UN number or packing group must be included. For dangerous goods transported in salvage packagings, an estimate of the quantity of dangerous goods must be given. The number and kind (e.g. drum, box, etc.) of packagings must also be indicated. Abbreviations may be used to specify the unit of measurement for the total quantity.~~The number of packages, type of packaging (e.g. steel drum, fibreboard box, etc.) and net quantity of dangerous goods in each package (by volume or mass as appropriate) must be indicated for each item of dangerous goods bearing a different proper shipping name, UN number or packing group. Abbreviations may be used to specify the unit of measurement for the quantity. For packages containing the same dangerous goods and quantity per package a multiple of the quantity may be used. For example:

UN 1263, Paint, 3, PG II, 5 fibreboard boxes x 5 L

Consignment comprising packages of different quantities of the same dangerous good must be clearly identified. For example:

UN 1263, Paint, 3, PG II, 5 fibreboard boxes x 5 L, 10 fibreboard boxes x 10 L

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 10 or 12 of Table 3-1 the gross mass of each package must be indicated, rather than the net quantity; and:

a) for empty uncleaned packagings as described by 4.1.4.3b) only the number and type of packagings need be shown;

b) for chemical kits and first aid kits, the total net mass of dangerous goods. Where the kits contain solids and/or liquids, the net mass of liquids within the kits is to be calculated on a 1 to 1 basis of their volume, i.e. 1 litre equal to 1 kilogram;

c) for dangerous goods in machinery or apparatus, the individual total quantities of dangerous goods in solid, liquid or gaseous state, contained in the article;

d) for dangerous goods transported in salvage packagings, an estimate of the quantity of dangerous goods must be given;

e) for items where "No Limit" is shown in column 10 or 12 the quantity shown should be the net mass or volume of the substance, except for UN 2800, UN 2807, UN 3072, UN 3166 and UN 3171 where the quantity shown should be the gross mass of the article.

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4.1.5.6 *Infectious substances and controlled substances*

~~The name and address of the person who offers the dangerous goods for transport and the name and full address of the consignee must be included on the dangerous goods transport document. For infectious substances (Division 6.2), and for controlled substances where~~ The dangerous goods transport document must also include the name and telephone number of a responsible person when a national law or international convention prohibits the disclosure of the technical name following an "n.o.s.*" ~~or generic proper shipping name, the name and telephone number of a responsible person must also be provided~~ entry or for infectious substances, UN 2814 and 2900.

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 in units of grams (g), or appropriate multiples thereof, may be used in place of activity;

. . .

4.1.5.7.2 The shipper must provide a statement regarding actions, if any, that are required to be taken by the carrier. The statement must be in the languages deemed necessary by the carrier or the authorities concerned, and must include at least the following points:

a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack or freight container including any special stowage provisions for the safe dissipation of heat (see 7;2.9.3.2), or a statement that no such requirements are necessary;

b) Restrictions on the type of aircraft and any necessary routeing instructions;

c) Emergency arrangements appropriate to the consignment.

4.1.5.7.3 In case of international transport of packages requiring competent authorities design or shipment approval, for which different approval types apply in the different countries concerned, 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.

4.1.5.7.3~~4~~ The applicable competent authority certificates need not necessarily accompany the consignment. The consignor must make them available.

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4.1.5.8 *Additional requirements*

4.1.5.8.3 When self-reactive substances of Division 4.1, or organic peroxides of Division 5.2 or other substances having similar properties, are offered for transport, the shipper must indicate on the dangerous goods transport document that the packages containing such substances must be protected from direct sunlight~~, stored away from~~ and all sources of heat and be placed in ~~a well~~ adequately-ventilated areas.

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Part 6
PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

Chapter 1
APPLICABILITY, NOMENCLATURE AND CODES

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1.2.7 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. ~~The transport of such a packaging by air is subject to the written approval of the State of Origin.~~

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Chapter 3
REQUIREMENTS FOR PACKAGINGS

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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 (EVOR) and Nylon. Thermoplastic processes ensuring uniformity of the completed container shall be applied. No used material other than production residues or regrind from the same manufacturing process may be used. The packaging shall be adequately resistant to ageing and to degradation caused either by the substance contained or by ultra-violet 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 1.8m 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 1200kPa.

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.

Criterion 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 be used.

Editorial Note.— Renumber subsequent paragraphs accordingly.

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Chapter 4
PACKAGING PERFORMANCE TESTS

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4.1 PERFORMANCE AND FREQUENCY OF TESTS

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4.1.6 Reserved ~~Where an outer packaging of a combination packaging has been successfully tested with different types of inner packagings, a variety of such different inner packagings may also be assembled in this outer packaging. In addition, provided an equivalent level of performance is maintained, the following variations in inner packagings are allowed without further testing of the package:~~

~~a) Inner packagings of equivalent or smaller size may be used provided:~~

~~1) the inner packagings are of similar design to the tested inner packagings (e.g. shape — round, rectangular, etc.);~~

~~2) the material of construction of the inner packagings (glass, plastics, metal, etc.) offers resistance to impact and stacking forces equal to or greater than that of the originally tested inner packaging;~~

~~3) the inner packagings have the same or smaller openings and the closure is of similar design (e.g. screw cap, friction lid, etc.);~~

~~4) sufficient additional cushioning material is used to take up void spaces and to prevent significant movement of the inner packagings; and~~

~~5) inner packagings are oriented within the outer packaging in the same manner as in the tested package.~~

~~b) A lesser number of the tested inner packagings, or of the alternative types of inner packagings identified in a) above, may be used provided sufficient cushioning is added to fill the void space(s) and to prevent significant movement of the inner packagings.~~

Note.— For the conditions for assembling different inner packagings in an outer packaging and permissible variations in inner packagings, see 4;1.1.9.1.

. . .

4.8 TEST REQUIREMENTS FOR SALVAGE PACKAGING

Salvage packagings (see ~~1.2~~1;3.1) must be tested and marked in accordance with the requirements applicable to Packing Group II packagings intended for the transport of solids or inner packagings, except as follows:

. . .

Chapter 5
REQUIREMENTS FOR THE CONSTRUCTION AND TESTING OF CYLINDERS AND CLOSED CRYOGENICRECEPTACLES, AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)

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5.1 GENERAL REQUIREMENTS

Note 1.— For aerosol dispensers and small receptacles containing gas (gas cartridges) see 5.4.

Note 2.— ~~For packagings for refrigerated liquefied gases see 5.1.3.6 and 5.5.~~For open cryogenic receptacles the requirements of Packing Instruction P 202 must be met.

5.1.1 Design and construction

5.1.1.1 Cylinders and closed cryogenic receptacles and their closures 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 normal conditions of transport.

5.1.1.2 In recognition of scientific and technological advances, and recognizing that cylinders and closed cryogenic receptacles other than those that are marked with a UN certification marking may be used on a national or regional basis, cylinders and closed cryogenic receptacles conforming to requirements other than those specified in these Instructions may be used if approved by the appropriate national authorities in the countries of transport and use.

5.1.1.3 In no case must the minimum wall thickness be less than that specified in the design and construction technical standards.

5.1.1.4 For welded cylinders and closed cryogenic receptacles, only metals of weldable quality must be used.

5.1.1.5 The test pressure of cylinders must be in accordance with packing instruction P200. The test pressure for closed cryogenic receptacles must be in accordance with packing instruction P202.

5.1.1.6 Not used.

5.1.1.7 Contact between dissimilar metals which could result in damage by galvanic action must be avoided.

5.1.1.8 The following additional requirements apply to the construction of closed cryogenic ~~cylinders~~ receptacles for refrigerated liquefied gases.

5.1.1.8.1 The mechanical properties of the metal used must be established for each ~~cylinder~~closed cryogenic receptacle, including the impact strength and the bending coefficient;

5.1.1.8.2 The ~~cylinders~~ closed cryogenic receptacles must be thermally insulated. The thermal insulation must be protected against impact by means of a jacket. If the space between the ~~cylinder~~ closed cryogenic receptacle and the jacket is evacuated of air (vacuum-insulation), the jacket must be designed to withstand without permanent deformation an external pressure of at least 100 kPa (1 bar) calculated in accordance with a recognized technical code or a calculated critical collapsing pressure of not less than 200 kPa (2 bar) gauge pressure. If the jacket is so closed as to be gas-tight (e.g. in the case of vacuum-insulation), a device must be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the ~~cylinder~~ closed cryogenic receptacle or its fittings. The device must prevent moisture from penetrating into the insulation.

5.1.1.8.3 Closed cryogenic receptacles intended for the transport of refrigerated liquefied gases having a boiling point below –182°C at atmospheric pressure must not include materials that may react with oxygen or oxygen-enriched atmospheres in a dangerous manner, when located in parts of the thermal insulation where there is a risk of contact with oxygen or oxygen-enriched liquid.

5.1.1.8.4 Closed cryogenic receptacles must be designed and constructed with suitable lifting and securing arrangements.

5.1.2 Materials

5.1.2.1 Construction materials of cylinders and closed cryogenic receptacles and their closures which are in direct contact with dangerous goods must not be affected or weakened by the dangerous goods intended and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods).

5.1.2.2 Cylinders and closed cryogenic receptacles and their closures must be made of the materials specified in the design and construction technical standards and the applicable packing instruction for the substances intended for transport in the cylinder and closed cryogenic receptacle. The materials must be resistant to brittle fracture and to stress corrosion cracking as indicated in the design and construction technical standards.

5.1.3 Service equipment

5.1.3.1 Except for pressure relief devices, valves, piping, fittings and other equipment subjected to pressure, must be designed and constructed to withstand at least 1.5 times the test pressure of the cylinders and closed cryogenic receptacles.

5.1.3.2 Service equipment must be configured or designed to prevent damage that could result in the release of the cylinder and closed cryogenic receptacle contents during normal conditions of handling and transport. The filling and discharge valves and any protective caps must be capable of being secured against unintended opening. Valves must be protected as specified in 4;4.1.1.8.

5.1.3.3 Cylinders and closed cryogenic receptacles that are not capable of being handled manually or rolled, must be fitted with devices (skids, rings, straps) ensuring that they can be safely handled by mechanical means and arranged so as not to impair the strength of, nor cause undue stresses, in the cylinder and closed cryogenic receptacle.

5.1.3.4 Individual cylinders and closed cryogenic receptacles must be equipped with pressure relief devices as specified in packing instruction P200(1) or P202, 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.

5.1.3.5 Cylinders and closed cryogenic receptacles whose filling is measured by volume must be provided with a level indicator.

5.1.3.6 *Additional requirements for closed cryogenic receptacles*

5.1.3.6.1 Not used.

5.1.3.6.2 For sections of piping which can be closed at both ends and where liquid product can be trapped, a method of automatic pressure-relief must be provided to prevent excess pressure build-up within the piping.

5.1.3.6.3 Each connection to a closed cryogenic receptacle must be clearly marked to indicate its function (e.g. vapour or liquid phase).

5.1.3.6.4 *Pressure-relief devices*

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

5.1.3.6.4.2 Closed cryogenic receptacles, having a nominal capacity of 550 L or less, must be provided with at least one 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 5.1.3.6.5. The pressure-relief device must be of the type that will resist dynamic forces including surge.

5.1.3.6.4.3 Connections to pressure-relief devices must be of sufficient size to enable the required discharge to pass unrestricted to the pressure-relief device.

5.1.3.6.4.4 All pressure-relief device inlets must under maximum filling conditions be situated in the vapour space of the closed cryogenic receptacle and the devices must be so arranged as to ensure that the escaping vapour is discharged unrestrictedly.

5.1.3.6.5 *Capacity and setting of pressure-relief devices*

Note.— In relation to pressure-relief devices, MAWP means the maximum effective gauge pressure permissible at the top of a loaded closed cryogenic receptacle in its operating position including the highest effective pressure during filling and discharge.

5.1.3.6.5.1 The pressure-relief device must open automatically at a pressure not less than the MAWP and be fully open at a pressure equal to 110% of the MAWP. It must, after discharge, close at a pressure not lower than 10% below the pressure at which discharge starts and must remain closed at all lower pressures.

5.1.3.6.5.2 Not used.

5.1.3.6.5.3 In the case of the loss of vacuum in a vacuum-insulated closed cryogenic receptacle the combined capacity of all pressure-relief devices installed must be sufficient so that the pressure (including accumulation) inside the closed cryogenic receptacle does not exceed 120% of the MAWP.

5.1.3.6.5.4 The required capacity of the pressure-relief devices must be calculated in accordance with an established technical code recognized by the appropriate national authority. (See for example CGA Publications S-1.2-1995 and S-1.1-2001).

5.1.4 Initial inspection and testing

5.1.4.1 New cylinders~~, other than closed cryogenic receptacles,~~ must be subjected to inspection and testing during and after manufacture in accordance with the applicable design standards including the following:

On an adequate sample of cylinders:

a) testing of the mechanical characteristics of the material of construction;

b) verification of the minimum wall thickness;

c) verification of the homogeneity of the material for each manufacturing batch;

d) inspection of the external and internal conditions of the cylinders;

e) inspection of the neck threads;

f) verification of the conformance with the design standard;

For all cylinders:

g) a hydraulic pressure test. Cylinders must withstand the test pressure without expansion greater than that allowed in the design specifications;

Note.— 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.

h) Inspection and assessment of manufacturing defects and either repairing them or rendering the cylinders unserviceable. In the case of welded cylinders, particular attention must be paid to the quality of the welds;

i) an inspection of the markings on the cylinders;

j) in addition, cylinders intended for the transport of UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, must be inspected to ensure proper installation and condition of the porous mass and, if applicable, the quantity of solvent.

5.1.4.2 On an adequate sample of closed cryogenic receptacles, the inspections and tests specified in 5.1.4.1 a), b), d) and f) must be performed. In addition, welds must be inspected by radiographic, ultrasonic or another suitable non-destructive test method on a sample of closed cryogenic receptacles according to the applicable design and construction standard. This weld inspection does not apply to the jacket.

~~5.1.4.3~~ Additionally, all closed cryogenic receptacles must undergo the inspections and tests specified in 5.1.4.1 g), h) and i), as well as a leakproofness test and a test of the satisfactory operation of the service equipment after assembly.

5.1.5 Periodic inspection and testing

5.1.5.1 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~~ing~~ 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 ~~or~~ testing, ultrasonic examination or a combination of acoustic emission testing and ultrasound examination.

5.1.5.2 For cylinders intended for the transport of UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, only the external condition (corrosion, deformation) and the condition of the porous mass (loosening, settlement) must be examined.

5.1.6 Approval of cylinders and closed cryogenic receptacles

5.1.6.1 The conformity of cylinders and closed cryogenic receptacles must be assessed at the time of manufacture as required by the appropriate national authority. Cylinders and closed cryogenic receptacles must be inspected, tested and approved by an inspection body. The technical documentation must include full specifications on design and construction, and full documentation on the manufacturing and testing.

5.1.6.2 Quality assurance systems must conform to the requirements of the appropriate national authority.

5.1.7 Requirements for manufacturers

5.1.7.1 The manufacturer must be technically able and must possess all resources required for the satisfactory manufacture of cylinders and closed cryogenic receptacles; this relates in particular to qualified personnel:

a) to supervise the entire manufacturing process;

b) to carry out joining of materials; and

c) to carry out the relevant tests.

5.1.7.2 The proficiency test of a manufacturer must in all instances be carried out by an inspection body approved by the appropriate national authority of the country of approval.

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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:

. . .

ISO 11119-2:2002 Gas cylinders of composite construction — Specification and test methods — Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners.

ISO 11119-3:2002 Gas cylinders of composite construction — Specification and test methods — Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners.

Note.— 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.

. . .

5.2.1.3 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5.

Note.— The maximum of 1,000 L volume as mentioned in the ISO standard ISO 21029-1:2004 Cryogenic vessels, does not apply for refrigerated liquefied gases in closed cryogenic receptacles installed in apparatus (e.g. MRI or cooling machines).

. . .

~~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.*~~

. . .

5.2.1.4 The following standard applies for the design, construction and initial inspection and test of UN closed cryogenic receptacles, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 5.2.5:

ISO 21029-1:2004 Cryogenic vessels — Transportable vacuum insulated vessels of not more than 1000 L volume — Part 1: Design, fabrication, inspection and tests.

. . .

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), the following standards apply to material compatibility:

ISO 11114-1:1997 Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials.

ISO 11114-2:2000 Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials.

. . .

5.2.5 Conformity assessment system and approval for manufacture of cylinders and closed cryogenic receptacles

5.2.5.1 *Definitions*

For the purposes of this section:

Conformity assessment system: a system for appropriate national authority approval of a manufacturer, by cylinder and closed cryogenic receptacle design type approval, approval of manufacturer's quality system and approval of inspection bodies.

Design type: a cylinder and closed cryogenic receptacle design as specified by a particular cylinder and closed cryogenic receptacle standard.

Verify: confirm by examination or provision of objective evidence that specified requirements have been fulfilled.

5.2.5.2 *General requirements*

Appropriate national authority

5.2.5.2.1 The appropriate national authority that approves the cylinder and closed cryogenic receptacle must approve the conformity assessment system for the purpose of ensuring that cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves a cylinder and closed cryogenic receptacle is not the appropriate national authority in the country of manufacture, the marks of the approval country and the country of manufacture must be indicated in the cylinder and closed cryogenic receptacle marking (see 5.2.~~6~~7 and 5.2.~~7~~8).

~~5.2.5.2.1.1~~ The appropriate national authority of the country of approval must supply, upon request, evidence demonstrating compliance to this conformity assessment system to its counterpart in a country of use.

5.2.5.2.2 The appropriate national authority may delegate its conformity assessment system functions in whole or in part.

5.2.5.2.3 The appropriate national authority must ensure that a current list of approved inspection bodies and their identity marks and approved manufacturers and their identity marks is available.

Inspection body

5.2.5.2.4 The inspection body must be approved by the appropriate national authority for the inspection of cylinders and closed cryogenic receptacles and must:

a) have a staff with an organizational structure, capable, trained, competent, and skilled, to satisfactorily perform its technical functions;

b) have access to suitable and adequate facilities and equipment;

c) operate in an impartial manner and be free from any influence which could prevent it from doing so;

d) ensure commercial confidentiality of the commercial and proprietary activities of the manufacturer and other bodies;

e) maintain clear demarcation between actual inspection body functions and unrelated functions;

f) operate a documented quality system;

g) ensure that the tests and inspections specified in the relevant cylinder and closed cryogenic receptacle standard and these instructions are performed; and

h) maintain an effective and appropriate report and record system in accordance with 5.2.5.6.

5.2.5.2.5 The inspection body must perform design type approval, cylinder and closed cryogenic receptacle production testing and inspection, and certification to verify conformity with the relevant cylinder and closed cryogenic receptacle standard (see 5.2.5.~~1~~4 and 5.2.5.~~4~~5).

Manufacturer

5.2.5.2.6 The manufacturer must:

a) operate a documented quality system in accordance with 5.2.5.3;

b) apply for design type approvals in accordance with 5.2.5.4;

c) select an inspection body from the list of approved inspection bodies maintained by the appropriate national authority in the country of approval; and

d) maintain records in accordance with 5.2.5.6.

Testing laboratory

5.2.5.2.7 The testing laboratory must have:

a) staff with an organizational structure, sufficient in number, competence, and skill; and

b) suitable and adequate facilities and equipment to perform the tests required by the manufacturing standard to the satisfaction of the inspection body.

e) management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 5.2.5.3.2;

f) the process describing how customer requirements are met;

g) the process for control of documents and their revision;

h) the means for control of non-conforming cylinders, purchased components, in-process and final materials; and

i) training programmes and qualification procedures for relevant personnel.

5.2.5.3 *Manufacturer's quality system*

5.2.5.3.1 The quality system must contain all the elements, requirements, and provisions adopted by the manufacturer. It must be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The contents must in particular include adequate descriptions of:

a) the organizational structure~~,~~ and responsibilities~~, and power of the management~~ of personnel with regard to design and product quality;

b) the design control and design verification techniques, processes~~,~~ and ~~systematic actions~~ procedures that will be used when designing the cylinders and closed cryogenic receptacles;

c) the relevant cylinder and closed cryogenic receptacle manufacturing, quality control, quality assurance, and process operation instructions that will be used;

d) quality records, such as inspection reports, test data~~,~~ and calibration data;

e) management reviews to ensure the effective operation of the quality system arising from the audits in accordance with 5.2.5.3.2;

f) the process describing how customer requirements are met;

g) the process for control of documents and their revision;

h) the means for control of non-conforming cylinders and closed cryogenic receptacles, purchased components, in-process and final materials; and

i) training programmes and qualification procedures for relevant personnel.

. . .

5.2.5.4 *Approval process*

Initial design type approval

5.2.5.4.1 The initial design type approval must consist of the approval of the manufacturer's quality system and the approval of the cylinder and closed cryogenic receptacle design to be produced. An application for an initial design type approval must meet the requirements of ~~5.2.5.3,~~ 5.2.5.4.2 to 5.2.5.4.6 and 5.2.5.4.9.

5.2.5.4.2 A manufacturer desiring to produce cylinders and closed cryogenic receptacles in accordance with a cylinder and closed cryogenic receptacle standard and these Instructions must apply for, obtain, and retain a Design Type Approval Certificate issued by the appropriate national authority in the country of approval for at least one cylinder and closed cryogenic receptacle design type in accordance with the procedure given in 5.2.5.4.9. This certificate must, on request, be submitted to the appropriate national authority of the country of use.

5.2.5.4.3 An application must be made for each manufacturing facility and must include:

a) the name and registered address of the manufacturer and in addition, if the application is submitted by an authorized representative, its name and address;

b) the address of the manufacturing facility (if different from the above);

c) the name and title of the person(s) responsible for the quality system;

d) the designation of the cylinder and closed cryogenic receptacle and the relevant cylinder and closed cryogenic receptacle standard;

e) details of any refusal of approval of a similar application by any other appropriate national authority;

f) the identity of the inspection body for design type approval;

g) documentation on the manufacturing facility as specified under 5.2.5.3.1; and

h) the technical documentation required for design type approval, which must enable verification of the conformity of the cylinders and closed cryogenic receptacles with the requirements of the relevant cylinder and closed cryogenic receptacle design standard. The technical documentation must cover the design and method of manufacture and must contain, as far as is relevant for assessment, at least the following:

   i) cylinder and closed cryogenic receptacle design standard, design and manufacturing drawings, showing components and sub-assemblies, if any;

   ii) descriptions and explanations necessary for the understanding of the drawings and intended use of the cylinders and closed cryogenic receptacles;

   iii) a list of the standards necessary to fully define the manufacturing process;

   iv) design calculations and material specifications; and

   v) design type approval test reports, describing the results of examinations and tests carried out in accordance with 5.2.5.4.9.

5.2.5.4.4 An initial audit in accordance with 5.2.5.3.2 must be performed to the satisfaction of the appropriate national authority.

5.2.5.4.5 If the manufacturer is denied approval, the appropriate national authority must provide written detailed reasons for such denial.

5.2.5.4.6 Following approval, changes to the information submitted under 5.2.5.4.3 relating to the initial approval must be provided to the appropriate national authority.

Subsequent design type approvals

5.2.5.4.7 An application for a subsequent design type approval must encompass the requirements of 5.2.5.4.8 and 5.2.5.4.9, provided a manufacturer is in possession of an initial design type approval. In such a case, the manufacturer's quality system according to 5.2.5.3 must have been approved during the initial design type approval and must be applicable for the new design.

5.2.5.4.8 The application must include:

a) the name and address of the manufacturer and in addition, if the application is submitted by an authorized representative, its name and address;

b) details of any refusal of approval of a similar application by any other appropriate national authority;

c) evidence that initial design type approval has been granted; and

d) the technical documentation, as described in 5.2.5.4.3 h).

Procedure for design type approval

5.2.5.4.9 The inspection body must:

a) examine the technical documentation to verify that:

i) the design is in accordance with the relevant provisions of the standard; and

ii) the prototype lot has been manufactured in conformity with the technical documentation and is representative of the design;

b) verify that the production inspections have been carried out as required in accordance with 5.2.5.5;

c) select cylinders and closed cryogenic receptacles from a prototype production lot and supervise the tests of these cylinders and closed cryogenic receptacles as required for design type approval;

d) perform or have performed the examinations and tests specified in the cylinder and closed cryogenic receptacle standard to determine that:

i) the standard has been applied and fulfilled; and

ii) the procedures adopted by the manufacturer meet the requirements of the standard; and

e) ensure that the various type approval examinations and tests are correctly and competently carried out.

After prototype testing has been carried out with satisfactory results and all applicable requirements of 5.2.5.4 have been satisfied, a Design Type Approval Certificate must be issued which must include the name and address of the manufacturer, results and conclusions of the examination, and the necessary data for identification of the design type.

If the manufacturer is denied a design type approval, the appropriate national authority must provide written detailed reasons for such denial.

5.2.5.4.10 *Modifications to approved design types*

The manufacturer must either:

a) inform the issuing appropriate national authority of modifications to the approved design type, where such modifications do not constitute a new design, as specified in the cylinder and closed cryogenic receptacle standard; or

b) request a ~~A~~ subsequent design type approval ~~must be requested~~ where such modifications constitute a new design according to the relevant cylinder and closed cryogenic receptacle standard. This additional approval must be given in the form of an amendment to the original Design Type Approval Certificate.

5.2.5.4.11 Upon request, the appropriate national authority must communicate to any other appropriate national authority, information concerning design type approval, modifications of approvals, and withdrawn approvals.

5.2.5.5 *Production inspection and certification*

5.2.5.5.1 An inspection body, or its delegate, must carry out the inspection and certification of each cylinder. The inspection body selected by the manufacturer for inspection and testing during production may be different from the inspection body used for the design type approval testing.

5.2.5.5.2 Where it can be demonstrated to the satisfaction of the inspection body that the manufacturer has trained and competent inspectors, independent of the manufacturing operations, inspection may be performed by those inspectors. In such a case, the manufacturer must maintain training records of the inspectors.

5.2.5.5.3 The inspection body must verify that the inspections by the manufacturer and tests performed on those cylinders and closed cryogenic receptacles, fully conform to the standards and requirements of these Instructions. Should non-conformance in conjunction with this inspection and testing be determined, the permission to have inspection performed by the manufacturer's inspectors may be withdrawn.

5.2.5.5.4 The manufacturer must, after approval by the inspection body, make a declaration of conformity with the certified design type. The application of the cylinder and closed cryogenic receptacle

certification marking must be considered a declaration that the cylinder and closed cryogenic receptacle complies with the applicable cylinder and closed cryogenic receptacle standards, the requirements of this conformity assessment system and these Instructions. The inspection body must affix or delegate the manufacturer to affix the cylinder and closed cryogenic receptacle certification marking and the registered mark of the inspection body to each approved cylinder or closed cryogenic receptacle.

5.2.5.5.5 A certificate of compliance, signed by the inspection body and the manufacturer, must be issued before the cylinders and closed cryogenic receptacles are filled.

5.2.5.6 *Records*

Design type approval and certificate of compliance records must be retained by the manufacturer and the inspection body for not less than 20 years.

5.2.6 Approval system for periodic inspection and test of cylinders and closed cryogenic receptacles

5.2.6.1 *Definitions*

For the purposes of this section:

Approval system: means a system for the appropriate national authority approval of a body performing the periodic inspection and test of cylinders and closed cryogenic receptacles (hereinafter referred to as "periodic inspection and test body"), including approval of that body's quality system.

5.2.6.2 *General requirements*

Appropriate national authority

5.2.6.2.1 The appropriate national authority must establish an approval system for the purpose of ensuring that the periodic inspection and test of cylinders and closed cryogenic receptacles conform to the requirements of these Instructions. In instances where the appropriate national authority that approves the body performing periodic inspection and test of a cylinder and closed cryogenic receptacle is not the appropriate national authority of the country approving the manufacture of the cylinder, the marks of the approval country of periodic inspection and test must be indicated in the cylinder and closed cryogenic receptacle marking (see 5.2.7).

. . .

5.2.6.3 *Quality system and audit of the periodic inspection and test body*

5.2.6.3.1 *Quality system*

The quality system must contain all the elements, requirements and provisions adopted by the periodic inspection and test body. It must be documented in a systematic and orderly manner in the form of written policies, procedures and instructions.

The quality system must include:

a) a description of the organizational structure and responsibilities;

b) the relevant inspection and test, quality control, quality assurance and process operation instructions that will be used;

c) quality records, such as inspection reports, test data, calibration data and certificates;

d) management reviews to ensure the effective operation of the quality system arising from the audits performed in accordance with 5.2.6.3.2;

e) a process for control of documents and their revision;

f) a means for control of non-conforming cylinders and closed cryogenic receptacles; and training programmes and qualification procedures for relevant personnel.

5.2.6.3.2 *Audit*

The periodic inspection and test body and its quality system must be audited in order to determine whether it meets the requirements of these Instructions to the satisfaction of the appropriate national authority.

An audit must be conducted as part of the initial approval process (see 5.2.6.4.3). An audit may be required as part of the process to modify an approval (see 5.2.6.4.6).

Periodic audits must be conducted, to the satisfaction of the appropriate national authority, to ensure that the periodic inspection and test body continues to meet the requirements of these Instructions.

The periodic inspection and test body must be notified of the results of any audit. The notification must contain the conclusions of the audit and any corrective actions required.

5.2.6.3.3 *Maintenance of the quality system*

The periodic inspection and test body must maintain the quality system as approved in order that it remains adequate and efficient.

The periodic inspection and test body must notify the appropriate national authority that approved the quality system, of any intended changes, in accordance with the process for modification of an approval in 5.2.6.4.6.

5.2.6.4 *Approval process for periodic inspection and test bodies*

Initial approval

5.2.6.4.1 A body desiring to perform periodic inspection and test of cylinders and closed cryogenic receptacles in accordance with a cylinder and closed cryogenic receptacle standard and these Instructions must apply for, obtain and retain an Approval Certificate issued by the appropriate national authority.

This written approval must, on request, be submitted to the appropriate national authority of a country of use.

5.2.6.4.2 An application must be made for each periodic inspection and test body and must include:

a) the name and address of the periodic inspection and test body and, if the application is submitted by an authorized representative, its name and address;

b) the address of each facility performing the periodic inspection and test;

c) the name and title of the person(s) responsible for the quality system;

d) the designation of the cylinders and closed cryogenic receptacles, the periodic inspection and test methods and the relevant cylinder and closed cryogenic receptacle standards encompassed by the quality system;

e) documentation on each facility, the equipment and the quality system as specified under 5.2.6.3.1;

f) the qualifications and training records of the periodic inspection and test personnel; and

g) details of any refusal of approval of a similar application by any other appropriate national authority.

5.2.6.4.3 The appropriate national authority must:

a) examine the documentation to verify that the procedures are in accordance with the requirements of the relevant cylinder and closed cryogenic receptacle standards and these Instructions; and

b) conduct an audit in accordance with 5.2.6.3.2 to verify that the inspections and tests are carried out as required by the relevant cylinder and closed cryogenic receptacle standards and these Instructions, to the satisfaction of the appropriate national authority.

5.2.6.4.4 After the audit has been carried out with satisfactory results and all applicable requirements of 5.2.6.4 have been satisfied, an Approval Certificate must be issued. It must include the name of the periodic inspection and test body, the registered mark, the address of each facility and the necessary data for identification of its approved activities (e.g. designation of cylinders and closed cryogenic receptacles, periodic inspection and test method and cylinder and closed cryogenic receptacle standards).

5.2.6.4.5 If the periodic inspection and test body is denied approval, the appropriate national authority must provide written detailed reasons for such denial.

Modifications to periodic inspection and test body approvals

5.2.6.4.6 Following approval, the periodic inspection and test body must notify the issuing appropriate national authority of any modifications to the information submitted under 5.2.6.4.2 relating to the initial approval.

The modifications must be evaluated in order to determine whether the requirements of the relevant cylinder and closed cryogenic receptacle standards and these Instructions will be satisfied.

An audit in accordance with 5.2.6.3.2 may be required.

The appropriate national authority must accept or reject these modifications in writing, and an amended Approval Certificate must be issued as necessary.

5.2.6.4.7 Upon request, the appropriate national authority must communicate to any other appropriate national authority, information concerning initial approvals, modifications of approvals and withdrawn approvals.

5.2.6.5 *Periodic inspection and test and certification*

The application of the periodic inspection and test marking to a cylinder and closed cryogenic receptacle must be considered a declaration that the cylinder and closed cryogenic receptacle complies with the applicable cylinder and closed cryogenic receptacle standards and the requirements of these Instructions. The periodic inspection and test body must affix the periodic inspection and test marking, including its registered mark, to each approved cylinder and closed cryogenic receptacle (see 5.2.7.~~7~~6).

A record certifying that a cylinder and closed cryogenic receptacle has passed the periodic inspection and test must be issued by the periodic inspection and test body before the cylinder and closed cryogenic receptacle is filled.

5.2.6.6 *Records*

The periodic inspection and test body must retain records of the periodic inspection and test of cylinders and closed cryogenic receptacles (both passed and failed), including the location of the test facility, for not less than 15 years.

The owner of the cylinder and closed cryogenic receptacle must retain an identical record until the next periodic inspection and test unless the cylinder and closed cryogenic receptacle is permanently removed from service.

5.2.7 Marking of UN refillable cylinders and closed cryogenic receptacles

Refillable UN cylinders and closed cryogenic receptacles must be marked clearly and legibly with certification, operational and manufacturing marks. These marks must be permanently affixed (e.g.

stamped, engraved or etched) on the cylinder. The marks must be on the shoulder, top end or neck of the cylinder and closed cryogenic receptacle or on a permanently affixed component of the cylinder and closed cryogenic receptacle (e.g. welded collar or corrosion-resistant plate welded to the outer jacket of a closed cryogenic receptacle). Except for the UN packaging symbol, the minimum size of the marks must be 5 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 2.5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm. The minimum size of the UN packaging symbol must be 10 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm.

5.2.7.1 The following certification marks must be applied:

a) The UN packaging symbol 

This symbol must only be marked on cylinders and closed cryogenic receptacles that conform to the requirements of these Instructions for UN cylinders and closed cryogenic receptacles;

b) The technical standard (e.g. ISO 9809-1) used for the design, construction 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. "/").

5.2.7.2 The following operational marks must be applied:

f) The test pressure in bar, preceded by the letters "PH" and followed by the letters "BAR";

g) The mass of the empty cylinder and closed cryogenic receptacle including all permanently attached integral parts (e.g. neck ring, foot ring, etc.) in kilograms, followed by the letters "KG". This mass must not include the mass of valve, valve cap or valve guard, any coating, or porous mass for acetylene. The mass must be expressed to three significant figures rounded up to the last digit. For cylinders and closed cryogenic receptacles of less than 1 kg, the mass must be expressed to two significant figures rounded up to the last digit. In the case of cylinders for UN 1001 **Acetylene, dissolved** and UN 3374 **Acetylene, solvent free**, at least one decimal must be shown after the decimal point and two digits for cylinders of less than 1 kg;

h) The minimum guaranteed wall thickness of the cylinder in millimetres followed by the letters "MM". This mark is not required for cylinders with a water capacity less than or equal to 1 litre or for composite cylinders or for closed cryogenic receptacles;

i) In the case of cylinders for compressed gases, UN 1001 **Acetylene, dissolved**, and UN 3374 **Acetylene, solvent free**, the working pressure in bar, preceded by the letters "PW". In the case of

closed cryogenic receptacles, the maximum allowable working pressure preceded by the letters "MAWP";

j) In the case of cylinders for liquefied gases and ~~refrigerated liquefied gases~~ closed cryogenic receptacles, the water capacity in litres expressed to three significant figures rounded down to the last digit, followed by the letter "L". If the value of the minimum or nominal water capacity is an integer, the digits after the decimal point may be neglected;

k) In the case of cylinders for UN 1001 **Acetylene, dissolved**, the total of the mass of the empty receptacle, the fittings and accessories not removed during filling, any coating, the porous mass, the solvent and the saturation gas expressed to ~~two~~ three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal must be shown after the decimal point. For cylinders of less than 1 kg, the mass must be expressed to two significant figures rounded down to the last digit;

l) In the case of cylinders for UN 3374 **Acetylene, solvent free**, the total of the mass of the empty receptacle, the fittings and accessories not removed during filling, any coating, and the porous mass expressed to ~~two~~ three significant figures rounded down to the last digit followed by the letters "KG". At least one decimal must be shown after the decimal point. For cylinders of less than 1 kg, the mass must be expressed to two significant figures rounded down to the last digit.

5.2.7.3 The following manufacturing marks must be applied:

m) Identification of the cylinder thread (e.g. 25E). (This mark is not required for closed cryogenic receptacles);

n) 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;

o) The serial number assigned by the manufacturer;

p) In the case of steel cylinders and closed cryogenic receptacles and composite cylinders and closed cryogenic receptacles with steel liner intended for the transport of gases with a risk of hydrogen embrittlement, the letter "H" showing compatibility of the steel (see ISO 11114-1:1997).

5.2.7.4 The above marks must be placed in three groups:

— Manufacturing marks must be the top grouping and must appear consecutively in the sequence given in 5.2.7.3.

— The operational marks in 5.1.2.7.2 must be the middle grouping and the test pressure f) which must be immediately preceded by the working pressure (i) when the latter is required.

— Certification marks must be the bottom grouping and must appear in the sequence given in 5.2.7.1.

The following is an example of the markings applied to a cylinder:

m)	n)	o)	p)	
25E	D MF	765432	H	
i)	f)	g)	j)	h)
PW200PH	300BAR	62.1KG	50L	5.8MM
(un) a)	b)	c)	d)	e-)
	ISO 9809-1 F		IB	2000/12

5.2.7.5 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. In the case of closed cryogenic receptacles, such marks may be on a separate plate attached to the outer jacket. Such marks must not conflict with required marks.

5.2.7.6 Cylinders of composite construction with limited life must be marked with the letters "FINAL" followed by the expiry date, the year (four digits) and the month (two digits).

5.2.7.7 In addition to the preceding marks, each refillable cylinder and closed cryogenic receptacle 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. 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 authorized by the appropriate national authority for performing the 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.

5.2.7.8 For acetylene cylinders, with the agreement of the national authority, the date of the most recent periodic inspection and the stamp of the body performing the periodic inspection and test may be engraved on a ring held on the cylinder by the valve. The ring must be configured so that it can only be removed by disconnecting the valve from the cylinder.

5.2.8 Marking of non-refillable UN cylinders and closed cryogenic receptacles

5.2.8.1 Non-refillable UN cylinders and closed cryogenic receptacles must be marked clearly and legibly with certification and gas or cylinder and closed cryogenic receptacle specific marks. These marks

must be permanently affixed (e.g. stencilled, stamped, engraved, or etched) on the cylinder. Except when stencilled, the marks must be on the shoulder, top end or neck of the cylinder and closed cryogenic receptacle or on a permanently affixed component of the cylinder and closed cryogenic receptacle (e.g. welded collar). Except for the "UN" mark and the "DO NOT REFILL" mark, the minimum size of the marks must be 5 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 2.5 mm and closed cryogenic receptacles for cylinders with a diameter less than 140 mm. The minimum size of the "UN" mark must be 10 mm for cylinders and closed cryogenic receptacles with a diameter greater than or equal to 140 mm and 5 mm for cylinders and closed cryogenic receptacles with a diameter less than 140 mm. The minimum size of the "DO NOT REFILL" mark must be 5 mm.

5.2.8.2 The marks listed in 5.2.6.1 to 5.2.6.3 must be applied with the exception of g), h), and m). The serial number o) may be replaced by the batch number. In addition, the words "DO NOT REFILL" in letters of at least 5 mm in height are required.

5.2.8.3 The requirements of 5.2.6.4 must apply.

Note.— Non-refillable cylinders and closed cryogenic receptacles may, on account of their size, substitute this marking by a label.

5.2.8.4 Other marks are allowed provided they are made in low stress areas other than the side wall and are not of a size and depth that will create harmful stress concentrations. Such marks must not conflict with required marks.

5.3 REQUIREMENTS FOR NON-UN CYLINDERS AND NON-UN CLOSED CRYOGENIC RECEPTACLES

5.3.1 Cylinders and closed cryogenic receptacles not designed, constructed, inspected, tested and approved according to the requirements of 5.2 must be designed, constructed, inspected, tested and approved in accordance with the provisions of a technical code recognized by the appropriate national authority and the general requirements of 5.1.

5.3.2 Cylinders and closed cryogenic receptacles designed, constructed, inspected, tested and approved under the provisions of this section must not be marked with the UN packaging symbol.

5.3.3 For metallic cylinders, the construction must be such that the minimum burst ratio (burst pressure divided by test pressure) is:

1.50 for refillable cylinders,
2.00 for non-refillable cylinders.

5.3.4 Marking must be in accordance with the requirements of the appropriate national authority of the country of use.

5.4 REQUIREMENTS FOR AEROSOL DISPENSERS AND SMALL RECEPTACLES CONTAINING GAS (GAS CARTRIDGES)

5.4.1 Small receptacles containing gas (gas cartridges)

5.4.1.1 Each receptacle must be subjected to a test performed in a hot water bath; the temperature of the bath and the duration of the test must be such that the internal pressure reaches that which would be reached at 55°C (50°C if the liquid phase does not exceed 95 per cent of the capacity of the receptacle at 50°C–). If the contents are sensitive to heat or if the receptacles are made of plastics material which softens at this test temperature, the temperature of the bath must be set at between 20°C and 30°C but, in addition, one receptacle in 2 000 must be tested at the higher temperature.

5.4.1.2 No leakage or permanent deformation of a receptacle may occur, except that a plastic receptacle may be deformed through softening provided it does not leak.

5.4.2 Aerosol dispensers

Each filled aerosol dispenser must be subjected to a test performed in a hot water bath or an approved water bath alternative.

5.4.2.1 Hot water bath test

5.4.2.1.1 The temperature of the water bath and the duration of the test must be such that the internal pressure reaches that which would be reached at 55°C (50°C if the liquid phase does not exceed 95 percent of the capacity of the aerosol dispenser at 50°C). If the contents are sensitive to heat or if the aerosol dispensers are made of plastics material which softens at this test temperature, the temperature of the bath must be set at between 20°C and 30°C but, in addition, one aerosol dispenser in 2000 must be tested at the higher temperature.

5.4.2.1.2 No leakage or permanent deformation of an aerosol dispenser may occur, except that a plastic aerosol dispenser may be deformed through softening provided that it does not leak.

5.4.2.2 *Alternative methods*

With the approval of the appropriate national authority alternative methods which provide an equivalent level of safety may be used provided that the requirements of 5.4.2.2.1, 5.4.2.2.2 and 5.4.2.2.3 are met.

5.4.2.2.1 Quality system

Aerosol dispenser fillers and component manufacturers must have a quality system. The quality system must implement procedures to ensure that all aerosol dispensers that leak or that are deformed are rejected and not offered for transport.

The quality system must include:

a) a description of the organizational structure and responsibilities;

b) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;

c) quality records, such as inspection reports, test data, calibration data and certificates;

d) management reviews to ensure the effective operation of the quality system;

e) a process for control of documents and their revision;

f) a means for control of non-conforming aerosol dispensers;

g) training programmes and qualification procedures for relevant personnel; and

h) procedures to ensure that there is no damage to the final product.

An initial audit and periodic audits must be conducted to the satisfaction of the appropriate national authority. These audits must ensure the approved system is and remains adequate and efficient. Any proposed changes to the approved system must be notified to the appropriate national authority in advance.

5.4.2.2.2 *Pressure and leak testing of aerosol dispensers before filling*

Every empty aerosol dispenser must be subjected to a pressure equal to or in excess of the maximum expected in the filled aerosol dispensers at 55 °C (50 °C if the liquid phase does not exceed 95 percent of the capacity of the receptacle at 50 °C). This must be at least two-thirds of the design pressure of the aerosol dispenser. If any aerosol dispenser shows evidence of leakage at a rate equal to or greater than 3.3×10^{-2} mbar.l.s^{-1} at the test pressure, distortion or other defect, it must be rejected.

5.4.2.2.3 Testing of the aerosol dispensers after filling

Prior to filling the filler must ensure that the crimping equipment is set appropriately and the specified propellant is used.

Each filled aerosol dispenser must be weighed and leak tested. The leak detection equipment must be sufficiently sensitive to detect at least a leak rate of 2.0×10^{-3} mbar.l.s^{-1} at 20 °C.

Any filled aerosol dispenser which shows evidence of leakage, deformation or excessive weight must be rejected.

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:

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 2000 from each production batch.

~~**5.5 PACKAGING FOR REFRIGERATED LIQUEFIED GASES**~~

~~**5.5.1 Structural considerations**~~

~~5.5.1.1 *Service pressure*~~

~~a) The service pressure is the maximum gauge pressure permitted in the packaging at operating conditions. If the inner vessel is surrounded by a vacuum insulated jacket, design should be based upon service pressure plus 98 kPa.~~

~~b) The minimum service pressure must be 176 kPa gauge.~~

~~c) The maximum service pressure must not exceed 2 480 kPa gauge.~~

~~5.5.1.2 *Service temperature*~~

~~The service temperature is the minimum temperature at which the inner vessel may be used.~~

~~5.5.1.3 *Filling density*~~

~~The filling density is the percentage ratio of the mass of the contents in the packaging to the water capacity. For example, a filling density of 10 indicates that the packaging may contain 10 per cent of its water capacity as contents. A filling density of 110 indicates that the packaging may contain 110 per cent of its water capacity as contents. The filling density of the indicated deeply refrigerated gases must not exceed the values given in the table below.~~

~~5.5.1.4 *Material selection*~~

~~Materials selected for the inner vessel must be in accordance with the requirements or codes of the appropriate national authority.~~

* WHO Publication: *Quality assurance of pharmaceuticals. A compendium of guidelines and related materials. Volume 2: Good manufacturing practices and inspection.*

Setting of pressure controlling valve (kPa)	*Maximum permitted filling density by mass (per cent)*						
	Helium	*Neon*	*Argon*	*Nitrogen*	*Krypton*	*Xenon*	*Air*
a) Packaging having a water capacity of 454 L or less:							
0-176	12.5	116	136	78			
177-314	*	113	133	76			
315-520	*	110	130	74			
521-726	*	107	127	72			
727-1 178	*	102	122	70			
1 179-1 590	*	98	119	69			
1 591-2 030	*	94	115	68			
2 031-2 480	*	90	113	65			
b) Packaging having a water capacity greater than 454 L:							
0-176	12.5	113	133	76			
177-314	*	109	129	74			
315-520	*	104	125	71			
521-726	*	100	121	67			
727-1 178	*	92	115	64			
1 179-1 590	*	85	110	60			
1 591-2 030	*	77	105	56			
2 031-2 480	*	—	101	53			

* Since liquid helium is so volatile and is a very compressible fluid, a filling density of 12.5 should be used throughout.

Note. — Values for krypton, xenon and air will be developed later.

They must meet or exceed design requirements based on the service temperature of the packaging. A deeply refrigerated gas may be packaged in an inner vessel whose service temperature is lower than that required for the goods.

5.5.1.5 *Pressure vessel design*

a) The inner vessel of the packaging for deeply refrigerated gases must be designed, constructed and tested in accordance with the requirements and codes of the appropriate national authority in effect

~~at the time of its manufacture. The inner vessel of packagings having a water capacity in excess of 30 L, and whose service pressure is above 275 kPa, must be of welded construction.~~

~~b) All materials of the packaging which may contact the product must not be subject to any deterioration by the product.~~

~~c) Packagings for deeply refrigerated gases must not be seriously damaged or destroyed by any concentrated stresses which might be created at supports due to shear, bending or torsion imposed through the inner vessel's support system.~~

~~5.5.1.6 *Supports and shock absorption systems*~~

~~a) 1) Packagings up to 50 kg gross mass must withstand a free fall of 450 mm onto a rigid, non-resilient, flat and horizontal surface (such as concrete or steel) in any direction without damage to the supports or inner receptacle.~~

~~2) Packaging over 50 kg and up to 250 kg gross mass must withstand a vertical drop of 150 mm onto a rigid, non-resilient, flat and horizontal surface (such as steel or concrete), in the vertical direction, without damage to the supports or inner vessel. If the vertical to horizontal aspect ratio is greater than four, the packaging must also withstand a tip-over fall.~~

~~3) Packagings greater than 250 kg gross mass must withstand a corner drop of 150 mm onto a rigid, non-resilient flat and horizontal surface (such as concrete or steel) with the opposite corner on the ground, without damage to the supports or inner vessel.~~

~~b) Connections for tie-down cables must be capable of withstanding aircraft design loads.~~

~~5.5.1.7 *Outer jacket*~~

~~a) The outer jacket may be constructed of steel, stainless steel, aluminium or other material meeting the requirements of 5.1.1, 5.1.2 and 5.1.4. The outer jacket must be capable of withstanding internal vacuum and normal handling. It must maintain vacuum integrity.~~

~~b) The outer jacket must be at least 1.5 mm thick for diameters up to 250 mm. For diameters greater than 250 mm up to 510 mm its thickness must be at least 1.9 mm. Above 510 mm the outer jacket must be capable of withstanding a minimum critical collapsing pressure of 206 kPa. The minimum critical collapsing pressure is the minimum pressure at which buckling of the outer jacket begins to occur when that pressure is applied uniformly over the outside of the jacket.~~

~~5.5.1.8 *Insulation*~~

~~The packaging must be designed so that the total heat transfer from the atmosphere at 21°C to the product does not exceed 464 joule per hour.litre (J/h.L) of water capacity.~~

~~5.5.2 Piping and safety relief devices~~

~~5.5.2.1 *General requirements*~~

a) All valves, fittings, safety relief devices and other packaging accessories must be protected against damage in handling and should be designed to discourage tampering in transit.

b) All piping components must be manufactured from materials suitable for the service temperature of the packaging.

c) The bursting strength of all piping components must be at least four times the service pressure of the packaging. All joints between piping components must have comparable strength.

d) Provision must be made to prevent damage to piping due to thermal expansion and contraction, jarring and vibration.

e) The assembled piping must be proved free from leaks at not less than the packaging service pressure.

Note.— It may be necessary to remove relief devices for this test.

f) Each portion of liquid piping which can be closed at both ends must be provided with a relief device.

g) No intervening shut-off valves must be used between the product compartment and its relief devices.

h) Outlets of relief devices must be shielded from the weather and be so designed as to prevent the accumulation of foreign material and prevent decreasing flow below required capacity.

i) An inner vessel relief device must have direct communication with its vapour space. Relief device piping must avoid excessive pressure drop.

j) Relief valves must have suitable seating characteristics to prevent back-leakage to the packaging in the event that the ambient pressure should exceed the pressure of the packaging through descent of the aircraft.

k) With the exception of gauging devices, safety relief devices, manual vents and pressure controlling valves or devices, each pipe from the liquid packaging must be either:

1) closed with a plug, cap-bolted flange or plate; or

2) provided with a shut-off valve located as close to the tank as is practicable.

l) All tank inlets and outlets, except safety relief valves, must be marked to designate whether they communicate with vapour or liquid when the tank is filled to the maximum permitted filling density.

m) Connections to safety relief devices and discharge piping must be of sufficient size to provide the required rate of discharge through the safety relief devices and lines.

n) Each safety relief device associated with the tank itself must be plainly and permanently marked with the pressure in kilopascals at which it is set to discharge, with the actual rate of discharge of the device in cubic metres per second of air at 15.6°C and atmospheric pressure, and with the manu-facturer's name or trade-mark and catalogue number. The start-to-discharge value must be visible when the device is installed. The rated discharge capacity of the device must be determined at a pressure not to exceed 120 per cent of the set pressure of the device.

5.5.2.2 *Safety relief devices for refrigerated liquefied gas*

a) Packaging for service temperature at or above 27 K:

1) Each inner vessel of "low pressure" and "pressurized" packagings must be equipped with a safety relief valve set to open at a pressure which does not exceed 110 per cent of the packaging service pressure (unless otherwise specified by the appropriate national authority), and which has a minimum flow capacity of:

$$Q_a = \frac{91.83\ UA\ (327.5 - T)}{LC}\sqrt{\frac{ZT}{M}}$$

Note.— The value of "U" is to be determined at the average temperature between 327.5 K and "T" and the air or contained gas in the insulation space at a pressure of 100 kPa absolute, whichever results in the higher value for "U".

2) Each inner vessel of "low pressure" and "pressurized" packagings must also be equipped with a second relief device having a minimum flow capacity of:

$$Q_a = 5.85 \times 10^{-4}\ Gi\ UA^{0.82}$$

If the relief device is a safety relief valve, its set-to-open pressure should not exceed 110 per cent of the service pressure (unless otherwise specified by the appropriate national authority). If a frangible disc is used, its setting shall not exceed 150 per cent of the packaging service pressure (plus 98 kPa if vacuum insulation is used) or the packaging test pressure, whichever is lower (unless otherwise specified by the appropriate national authority).

3) The relief device specified in 2) above for refrigerated liquid neon packagings must have a path to the inner vessel separate from that used for the relief valve specified in 1) above. For "low pressure" shipments of refrigerated liquid neon, the relief valve specified in 1) above must be of the absolute pressure type.

b) Packagings for service temperature below 27 K:

1) For "low pressure" packagings:

The inner vessel must be equipped with an absolute pressure safety relief valve set to open at a pressure which does not exceed either 110 per cent of the packaging service pressure (unless otherwise specified by the appropriate national authority) or an absolute pressure of 275 kPa.

~~The inner vessel should also be provided with a second relief valve which communicates with the inner vessel by means of a separate path. This relief valve should be set to open at a pressure which does not exceed 110 per cent of the packaging service pressure (unless otherwise specified by the appropriate national authority). Unlessthe second relief valve is of the absolute pressure type, its setting shall be a minimum of 48 kPa higher than that of the absolute pressure relief valve.~~

~~Frangible discs may be used to provide supplemental relief capacity on packagings having a nominal capacity of 550 L or less. Frangible discs may not be used in packagings having a capacity in excess of 550 L. If a frangible disc is used, its setting shall not exceed 150 per cent of the packaging service pressure (plus 98 kPa if vacuum insulation is used) or the packaging test pressure, whichever is lower (unless otherwise specified by the appropriate national authority).~~

~~The combined flow capacity of the relief devices should equal or exceed:~~

~~$Q_a = 8.05 \times 10^{-3} UA$~~

~~where the value of "U" is based on one atmosphere of helium gas in the insulation space at an average temperature of 160 K.~~

~~2) Jacket relief device:~~

~~The insulation jacket must be provided with a pressure-actuated device which will function at a gauge pressure of not more than 176 kPa and provide a discharge area of 0.1 706 mm^2 per litre of water capacity of the packaging.~~

~~3) Other relief device sizing considerations:~~

~~Where greater inner vessel relief device capacity may be required due to other modes of heat transfer, these effects must be considered in sizing the liquid compartment relief devices (for example, liquid nitrogen or condensed air heat transfer to a straight vacuum insulated liquid helium or liquid neon compartment).~~

~~**5.5.3 Nomenclature**~~

~~Q_a — Flow capacity in m^3/s of free air at 120 per cent of the set-to-open pressure of the safety relief device.~~

~~U — Total thermal conductance of the packaging insulating material saturated with air or contained gas at atmospheric pressure in joules per second.square metre.kelvin ($J/s.m^2.K$) whichever is greater, at 37.8°C (use value at 37.8°C unless otherwise noted).~~

~~A — Total outer surface area of liquid packaging in m2.~~

~~T — Temperature of the liquid gas contained at set-to-open pressure of safety relief device, in K.~~

~~L Latent heat of the liquid gas contained at set-to-open pressure of safety relief device, in J/kg.~~

~~Z Compressibility factor at the liquid temperature and set-to-open pressure of the safety relief device.~~

~~M Molecular weight of the liquid gas contained.~~

~~Gi Insulation factor = 12.2 (dimensionless).~~

~~C Constant for gas or vapour related to the ratio of specific heats.~~

~~*Note. — When "k" is not known, 315 is a safe value for "C".*~~

$$C = 520\sqrt{k\left(\frac{2}{k+1}\right)^{\left(\frac{k+1}{k-1}\right)}}$$

~~k Ratio of specific heat at constant pressure to specific heat at constant volume at standard conditions of 0°C and 101.325 kPa.~~

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Chapter 7
REQUIREMENTS FOR THE CONSTR UCTION, TESTING AND APPROVAL OF PACKAGES AND MATERIAL OF CLASS 7

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7.4 REQUIREMENTS FOR INDUSTRIAL PACKAGES

7.4.1 Industrial packages Types 1, 2 and 3 (Types IP-1, IP-2 and IP-3) must meet the requirements specified in 7.1, 7.2 and 7.6.2.

7.4.2 A Type IP-2 package must, if it were subjected to the tests specified in 7.14.4 and 7.14.5, prevent:

a) loss or dispersal of the radioactive contents; and

b) ~~loss of shielding integrity which would result in~~ more than a 20 per cent increase in the maximum radiation level at any external surface of the package.

7.4.3 A Type IP-3 package must meet all the requirements specified in 7.6.2 to 7.6.15.

7.4.4 Alternative requirements for Industrial packages Types 2 and 3 (Types IP-2 and IP-3)

7.4.4.1 Packages may be used as a Type IP-2 package, provided that:

a) they satisfy the requirements of 7.4.1;

b) they are designed to conform to the standards prescribed in Part 6, Chapter 3 or other requirements at least equivalent to those standards; and

c) when subjected to the tests required for Packing Group I or II in Part 6, Chapter 4, they would prevent:

i) loss or dispersal of the radioactive contents; and

ii) ~~loss of shielding integrity which would result in~~ more than a 20 per cent increase in the maximum radiation level at any external surface of the package.

7.4.4.2 Freight containers 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 — Specifications and Testing — Part 1: General Cargo Containers" 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) ~~loss of shielding integrity which would result in~~ more than a 20 per cent increase in the maximum radiation level at any external surface of the freight containers.

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7.6 REQUIREMENTS FOR TYPE A PACKAGES

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7.6.14 A package must be designed so that if it were subjected to the tests specified in 7.14, it would prevent:

a) loss or dispersal of the radioactive contents; and

b) ~~loss of shielding integrity which would result in~~ more than a 20 per cent increase in the maximum radiation level at any external surface of the package.

7.6.15 The design of a package intended for liquid radioactive material must make provision for ullage to accommodate variations in the temperature of the contents, dynamic effects and filling dynamics.

7.6.16 Type A packages to contain liquids

A Type A package designed to contain ~~liquids~~ 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 liquid contents within the secondary outer containment components, even if the primary inner components leak.

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7.7 REQUIREMENTS FOR TYPE B(U) PACKAGES

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7.7.3 A package must be so designed that, under the ambient condition specified in 7.7.5 and in the absence of isolation, the temperature of the accessible surfaces of a package must not exceed 50 ^{0}C, unless the package is transported under exclusive use.

Editorial Note.— The following new 7.7.4 was originally 7.7.13.

7.7.4 In order to meet the requirements of 7.2.1, account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.

Editorial Note.— *Renumber* subsequent paragraphs accordingly.

~~7.7.13 In order to meet the requirements of 6.4.3.1, account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.~~

7.7.14 A package containing low dispersible radioactive material must be so designed so that any features added to the low dispersible radioactive material that are not part of it, or any internal

components of the packaging must not adversely affect the performance of the low dispersible radioactive material.

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7.10 REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

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7.10.2 Fissile material meeting one of the provisions in a) to d) below is excepted from the requirement to be transported in packages that comply with 7.10.3 to 7.10.12, as well as the other requirements of these Instructions that apply to fissile material. Only one type of exception is allowed per consignment:

a) A mass limit per consignment such that:

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

where X and Y are the mass limits defined in Table 6-5, 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;

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 ~~is~~ are not more than 5 g of fissile material in any 10 L volume of material. Neither beryllium nor deuterium in hydrogeneous material enriched in deuterium must be present in quantities exceeding 1 per cent of the applicable consignment mass limits provided in Table 6-5 except for deuterium in natural concentration in hydrogen.

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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 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

b) for packages containing uranium hexafluoride only, with maximum enrichment of 5 mass per cent uranium-235:

i) packages where, following the tests prescribed in 7.10.12 b), there is no physical contact between the valve and any other component of the packaging other than at its original point of attachment and where, in addition, following the test prescribed in 7.16.3, the valves remain leaktight; and

ii) a high degree of quality control in the manufacture, maintenance and repair of packagings coupled with tests to demonstrate closure of each package before each shipment.

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7.21 APPROVALS OF PACKAGE DESIGNS AND MATERIALS

7.21.1 The approval of designs for packages containing 0.1 kg or more of uranium hexafluoride requires that:

a) ~~after 31 December 2000,~~ each design that meets the requirements of 7.5.4 must require multilateral approval;

b) ~~after 31 December 2003,~~ each design that meets the requirements of 7.5.1 to 7.5.3 must require unilateral approval by the competent authority of the State of Origin of the design, unless multilateral approval is otherwise required by these Instructions.

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7.23 TRANSITIONAL MEASURES FOR CLASS 7

7.23.1 Packages not requiring competent authorityapproval of design under the 1985 and 1985 (As Amended 1990) editions of IAEA Safety Series No. 6

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7.23.1.2 Any packaging modified, unless to improve safety, or manufactured after 31 December 2003, must meet the requirements of these Instructions in full. Packages prepared for transport not later than 31 December 2003 under the 1985 or 1985 (As Amended 1990) editions of IAEA Safety Series No. 6 may continue in transport. Packages prepared for transport after this date must meet the requirements of these Instructions in full.

7.23.2 Packages approved under the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) editions of IAEA Safety Series No. 6

7.23.2.1 Packagings manufactured to a package design approved by the competent authority under the provisions of the 1973 or 1973 (As Amended) editions of IAEA Safety Series No. 6 may continue to be used subject to: multilateral approval of package design; the mandatory programme of quality

assurance in accordance with the applicable requirements of 1;1.3.3.1; the activity limits and material restrictions of 2;7.7; and, for a package containing fissile material and transported by air, the requirement of 7.10.10. No new manufacture of such packaging must be permitted to commence. Changes in the design of the packaging or in the nature or quantity of the authorized radioactive contents which, as determined by the competent authority, would significantly affect safety, must require that the requirements of these instructions be met in full. A serial number according to the provision of 5;2.4.5 c) must be assigned to and marked on the outside of each packaging.

7.23.2.2 Packagings manufactured to a package design approved by the competent authority under the provisions of the 1985 or 1985 (As Amended 1990) editions of IAEA Safety Series No. 6 may continue to be used ~~until 31 December 2003~~ subject to the multilateral approval of package design; ~~:~~ the mandatory programme of quality assurance in accordance with the requirements of 1;1.3.3.1; the activity limits and material restrictions of 2;7.7; and, for a package containing fissile material and transported by air, the requirement of 7.10.10. ~~After this date use may continue subject, additionally, to multilateral approval of package design.~~ Changes in the design of the packaging or in the nature or quantity of the authorized radioactive contents which, as determined by the competent authority, would significantly affect safety must ensure that the requirements of these Instructions be met in full. All packagings for which manufacture begins after 31 December 2006 must meet the requirements of these Instructions in full.

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Part 7
OPERATOR'S RESPONSIBILITIES

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Chapter 1
ACCEPTANCE PROCEDURES

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1.1 ACCEPTANCE OF DANGEROUS GOODS BY OPERATORS

1.1.1 An operator must not accept from a shipper a freight container or a unit load device containing dangerous goods other than:

a) a freight container for radioactive material (see 6;7.1);

b) a unit load device or other type of pallet containing consumer commodities prepared according to Packing Instruction 910;

c) a unit load device or other type of pallet containing dry ice used as a refrigerant for other than dangerous goods prepared according to Packing Instruction 904; or

d) a unit load device or other type of pallet containing magnetized material.

1.1.2 An operator must not accept for transport aboard 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 1.1.1 b) and c) unless it is accompanied by two copies of the dangerous goods transport document or, where permitted, by the alternative documentation. One copy of the document 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. The operator must also not accept the package, overpack, freight container or a unit load device mentioned above unless he has inspected it, found it to be properly marked and labelled and determined that there is no leakage or other indication that its integrity has been compromised. With regard to overpacks and the packages they contain, the operator must take all reasonable steps to establish that:

a) the package or overpack does not contain packages of dangerous goods which require segregation according to Table 7-1;

b) the overpack does not contain packages bearing the "Cargo aircraft only" label unless:

1) the packages are assembled in such a way that clear visibility and easy access to them is possible; or

2) the packages are not required to be accessible under Part 7;2.4.1; or

3) not more than one package is involved;

c) proper shipping names, UN numbers, labels, "limited quantities" (when applicable) and special handling instructions appearing on the interior package(s) are clearly visible or reproduced on the outside of the overpack.

With regard to freight containers containing radioactive materials, the operator must ensure that all four sides of the container are correctly labelled.

When an operator accepts a unit load device or other type of pallet containing consumer commodities, dry ice or magnetized material as permitted by 1.1.1.b), c) or d), the operator must attach an identification tag as required by 2.7.1 to the unit load device.

Note. — Minor discrepancies, such as the omission of dots and commas in the proper shipping name appearing on the transport documents or on package markings or minor variations in hazard labels which do not affect the obvious meaning of the label are not considered as errors if they do not compromise safety and should not be considered as reason for rejecting a consignment.

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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;7.9. 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.

2.1.2 Under the conditions specified in S-5;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.

2.2 INCOMPATIBLE DANGEROUS GOODS

2.2.1 Segregation

Packages containing dangerous goods which might react dangerously one with another must not be stowed on an aircraft next to each other or in a position that would allow interaction between them in the event of leakage. As a minimum, the segregation scheme shown in Table 7-1 must be followed in order to maintain acceptable segregation between packages containing dangerous goods having different hazards. The scheme applies irrespective of whether the hazard is the primary or subsidiary risk.

2.2.2 Separation of explosive substances and articles

2.2.2.1 Only explosives in Division 1.4, compatibility group S, are permitted to be transported on passenger aircraft. Only the following explosives may be transported on a cargo aircraft:

Division 1.3 Compatibility groups C, G
Division 1.4 Compatibility groups B, C, D, E, G, S

~~2.2.2.1~~2.2.2.2 The extent to which explosives may be stowed together in an aircraft is determined by their "compatibility". Explosives are considered to be compatible if they can be stowed together without significantly increasing either the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident.

~~2.2.2.2 Explosives in Compatibility Groups A to K and N may be stowed in accordance with the following:~~

~~a) packages bearing the same compatibility group letter and the same division number may be stowed together;~~

~~b) explosives of the same compatibility group but different divisions may be stowed together providing the whole is treated as belonging to the division having the smaller number. However, when explosives of Division 1.5, Compatibility Group D, are stowed together with explosives of Division 1.2, Compatibility Group D, the total of the consignment must be treated as Division 1.1, Compatibility Group D, for the purposes of transport;~~

~~c) packages bearing different compatibility group letters must not be stowed together, whether or not they belong to the same division, except as provided for in 2.2.2.3 and 2.2.2.4.~~

~~2.2.2.3 Explosives in Compatibility Groups C, D and E may be stowed together. The appropriate division is determined in accordance with 2.2.2.2 b). Any combination of articles in Compatibility Groups C, D and E is assigned to Compatibility Group E. Any combination of substances in Compatibility Groups C and D must be assigned to the most appropriate of the compatibility groups shown in the Dangerous Goods List, taking into account the predominant characteristics of the combined load.~~

~~2.2.2.4~~2.2.2.3 Explosives in Compatibility Group S may be stowed with explosives in all compatibility groups ~~other than A and L~~.

~~2.2.2.5 Explosives in Compatibility Group L must not be stowed with explosives in other compatibility groups and they may only be stowed with the same type of explosives in Compatibility Group L.~~

~~2.2.2.6 Explosives in Compatibility Group N must not be stowed with explosives in other compatibility groups except S. However, they may also be stowed together with explosives in Compatibility Groups C, D and E, when the explosives in Compatibility Group N must be considered as having Compatibility Group D (see also 2.2.2.3).~~

2.2.2.4 Except as provided for in 2.2.2.5 explosives of different compatibility groups may be stowed together, whether or not they belong to the same division.

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.

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Table 7-1. Segregation between packages

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Note 1.— See 2.2.2.2 through ~~2.2.2.4~~ 2.2.2.5.

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2.7 IDENTIFICATION OF UNIT LOAD DEVICES CONTAINING DANGEROUS GOODS

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2.7.2 This indication must be provided by attaching to the unit load device an identification tag having a border of prominent red hatchings on both sides and the minimum dimensions of 148 mm × 210 mm. The primary and subsidiary hazard class(es) or division(s) numbers of such dangerous goods must be ~~visibly indicated~~ clearly marked on this tag.

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2.11 LOADING OF DRY ICE

Dry ice (carbon dioxide, solid) when shipped by itself or when used as a refrigerant for other commodities, may be carried provided the operator has made suitable arrangements dependent on the aircraft type, the aircraft ventilation rates, the method of packing and stowing, whether animals will be carried on the same flight and other factors. The operator must ensure that ground staff are informed that the dry ice is being loaded or is on board the aircraft.

Where dry ice is contained in a unit load device or other type of pallet prepared by a single shipper in accordance with Packing Instruction 904 and the operator after acceptance adds additional dry ice then the operator must ensure that the information provided to the pilot-in-command reflects that revised quantity of dry ice.

Note.— For arrangements between the shipper and operator see Packing Instruction 904.

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Chapter 4
PROVISION OF INFORMATION

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INTRODUCTORY NOTE

Operators~~"~~' responsibilities on the provision of information to passengers are shown in Part 8.

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4.6 INFORMATION BY THE OPERATOR IN CASE OF AN AIRCRAFT ACCIDENT OR INCIDENT

4.6.1 In the event of:

a) an aircraft accident; or

b) serious incident where dangerous goods carried as cargo may be involved,

the operator of ~~an~~ the aircraft carrying dangerous goods as cargo must provide information, without delay, to emergency services responding to the accident or serious incident about the dangerous goods on board, as shown on the copy of the information to the pilot-in-command. As soon as possible, the operator must also provide this information to the appropriate authorities of the State of the Operator and the State in which the accident or serious incident occurred.

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4.7 CARGO ACCEPTANCE AREAS — PROVISION OF INFORMATION

An operator or the operator's handling agent must ~~shall~~ ensure that notices, sufficient in number and prominently displayed, are provided at acceptance points for cargo giving information about the transport of dangerous goods.

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Chapter 5
PROVISIONS CONCERNING PASSENGERS AND CREW

5.1 INFORMATION TO PASSENGERS

5.1.1 ~~Each~~ An operator ~~and airport operator~~ must ensure that information ~~is promulgated in such a manner that passengers are warned~~ as to the types of dangerous goods which ~~they are~~ a passenger is forbidden from transporting aboard an aircraft ~~as~~ is provided ~~for in 5.1.2~~ with the passenger ticket or made available in another manner to passengers prior to the check-in process.

5.1.2 An operator or ~~his~~ the operator's handling agent and the airport operator must ensure that notices warning ~~information is provided for~~ passengers as to the ~~about the~~ types of dangerous goods

which they are forbidden from transporting aboard an aircraft are~~. As a minimum this information must consist of:~~

~~a) information with the passenger ticket or in another manner such that prior to or during the check-in process the passenger receives the information; and~~

~~b) notices sufficient in number and~~ prominently displayed in sufficient number at each of the places at an airport where tickets are issued, passengers checked in and aircraft boarding areas maintained, and at any other location where passengers are checked in.

5.2 PASSENGER CHECK-IN PROCEDURES

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5.2.2 ~~Check-in staff should seek confirmation from a passenger about the contents of any item where there are suspicions that it may contain dangerous goods, w~~With the aim of preventing dangerous goods which passengers are not permitted to have from being taken ~~on~~ aboard an aircraft in their baggage or on their person, check-in staff should seek confirmation from a passenger that they are not carrying dangerous goods that are not permitted, and seek further confirmation about the contents of any item where there are suspicions that it may contain dangerous goods that are not permitted. Many innocuous-looking items may contain dangerous goods and a list of general descriptions which, experience has shown, are often applied to such items is shown in Part 7, Chapter 6.

Chapter 6
PROVISIONS TO AID RECOGNITION OF UNDECLARED DANGEROUS GOODS

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), ~~cargo acceptance staff and passenger check-in staff should be given~~ 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 acceptance staff and passenger check-in staff as appropriate and must be readily available to such staff. The following is a list of ~~such~~ general descriptions and the types of dangerous goods that may be included in any item bearing that description.

. . .

semen — may be packed with dry ice or refrigerated liquefied gas (see also dry shipper)

ships' spares — may contain explosives (flares), cylinders of compressed gas (life rafts), paint, lithium batteries (emergency locator transmitters) etc.

swimming pool chemicals — may contain oxidizing or corrosive substances

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Part 8
PROVISIONS CONCERNING PASSENGERS AND CREW

1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

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1.1.2 The provisions of these Instructions do not apply to the following when carried by passengers or crew members or in baggage, transported by the operator, that has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage):

a) when in retail packagings, alcoholic beverages containing more than 24 per cent but not more than 70 per cent alcohol by volume, in receptacles not exceeding 5 L, with a total net quantity per person of 5 L for such beverages;

Note.— Alcoholic beverages containing not more than 24 per cent alcohol by volume are not subject to any restrictions.

. . .

f) dry ice in quantities not exceeding 2.5 kg per person, when used to pack perishables that are not subject to these Instructions, provided the package permits the release of carbon dioxide gas. The dry ice may be either:

— in carry-on baggage; or

— with the approval of the operator(s), in checked baggage~~;~~.

When carried in checked baggage, each package must be marked:

— "DRY ICE" or "CARBON DIOXIDE, SOLID"; and

— with the net weight of dry ice or an indication that the net weight is 2.5 kg or less;

g) one small packet of safety matches or a cigarette lighter that does not contain ~~intended for use by an individual when carried on the person. However, lighters containing~~ unabsorbed liquid fuel (other than liquefied gas), intended for use by an individual when carried on the person. ~~lighter fuel and lighter refills are not permitted on one~~"s person or ~~in checked or carry-on baggage~~ Matches and lighters are not permitted in checked or carry-on baggage. Lighter fuel and lighter refills are not permitted on one's person, in carry-on or checked baggage;

Note.— "Strike anywhere" matches are forbidden for air transport.

. . .

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

q) consumer 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. Spare batteries must be individually protected so as to prevent short circuits and carried in carry-on baggage only. In addition, each spare battery must not exceed the following quantities:

— for lithium metal or lithium alloy batteries, a lithium content of not more than 2 grams; or

— for lithium ion batteries, an aggregate equivalent lithium content of not more than 8 grams~~.~~; and

r) portable electronic devices (for example cameras, cellular phones, laptop computers, and camcorders) powered by fuel cell systems, and spare fuel cartridges, under the following conditions:

1) fuel cell cartridges may only contain flammable liquids (including methanol), formic acid and butane;

2) fuel cell cartridges must comply with IEC PAS 62282-6-1 Ed. 1;

3) fuel cell cartridges must not be refillable by the user. Refueling of fuel cell systems 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;

4) the maximum quantity of fuel in any fuel cell cartridge must not exceed:

a) for liquids 200 ml;

b) for liquefied gases, 120 ml for non-metallic fuel cell cartridges or 200 ml for metal fuel cell cartridges;

5) each fuel cell cartridge must be marked with a manufacturer's certification that it conforms to IEC PAS 62282-6-1 Ed. 1, and with the maximum quantity and type of fuel in the cartridge;

6) each fuel cell system 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;

7) no more than two spare fuel cell cartridges may be carried by a passenger;

8) fuel cell systems containing fuel and fuel cell cartridges including spare cartridges are permitted in carry-on baggage only;

9) interaction between fuel cells and integrated batteries in a device must conform to IEC PAS 62282-6-1 Ed. 1. Fuel cell systems whose sole function is to charge a battery in the device are not permitted;

10) fuel cell 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

11) in addition to the languages which may be required by the State of Origin for the markings specified above, English should be used.

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	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Aerosols**, flammable	1950	2.1		Gas flammable		☑		203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable	1950	2.1		Gas flammable		A145		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	Gas flammable & Toxic & Corrosive		☑		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	Gas flammable & Toxic & Corrosive		A145		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	Gas flammable & Corrosive		☑		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	Gas flammable & Corrosive		A145		203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, flammable (engine starting fluid)	1950	2.1		Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1		FORBIDDEN		203	150 kg
≠	**Aerosols**, flammable (engine starting fluid)	1950	2.1		Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145		FORBIDDEN		203	150 kg
*	**Aerosols**, flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.1	6.1	Gas flammable & Toxic		☑		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	Gas flammable & Toxic		A145		203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, non-flammable	1950	2.2		Gas non-flammable		☑ A98		203 or 204 Y203 or Y204	75 kg 30 kg G	203 or 204	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
≠	**Aerosols**, non-flammable	1950	2.2		Gas non-flammable		A98 A145		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	Gas non-flammable & Toxic & Corrosive		☑		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	Gas non-flammable & Toxic & Corrosive		A145		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	Gas non-flammable & Corrosive		☑		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	Gas non-flammable & Corrosive		A145		203 Y203	75 kg 30 kg G	203	150 kg
*	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1		FORBIDDEN		212	50 kg
≠	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145		FORBIDDEN		212	50 kg
*	**Aerosols**, non-flammable, toxic, containing substances in Division 6.1, Packing Group III	1950	2.2	6.1	Gas non-flammable & Toxic		☑		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	Gas non-flammable & Toxic		A145		203 Y203	75 kg 30 kg G	203	150 kg
+	**Aerosols**, oxidizing	1950	2.2	5.1	Gas non-flammable & Oxidizer				203	75 kg	203	150 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Alcohols, n.o.s.***	1987	3		Liquid flammable		☑ A3	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Alcohols, n.o.s.***	1987	3		Liquid flammable		A3 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Alkali metal dispersion**	1391	4.3		Danger if wet		☑ A63 A84	I	FORBIDDEN		409	1 L
≠	**Alkali metal dispersion**	1391	4.3		Danger if wet		A84 A147	I	FORBIDDEN		409	1 L
*	**Alkaline earth metal dispersion**	1391	4.3		Danger if wet		☑ A63 A85	I	FORBIDDEN		409	1 L
≠	**Alkaline earth metal dispersion**	1391	4.3		Danger if wet		A85 A147	I	FORBIDDEN		409	1 L
*	**Ammonia, anhydrous**	1005	2.3	8	☑ Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A126		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Ammonia, anhydrous**	1005	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2		FORBIDDEN		FORBIDDEN	
*	**Ammonia solution**, relative density less than 0.880 at 15ºC in water, with more than 50% ammonia	3318	2.3	8	☑ Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A126		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Ammonia solution**, relative density less than 0.880 at 15ºC in water, with more than 50% ammonia	3318	2.3	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	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
*	**Arsenical pesticide, liquid, flammable, toxic*,** flash point less than 23ºC	2760	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Arsenical pesticide, liquid, flammable, toxic*,** flash point less than 23ºC	2760	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Arsenical pesticide, liquid, toxic***	2994	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Arsenical pesticide, liquid, toxic***	2994	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Arsenical pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2993	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Arsenical pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2993	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Arsenical pesticide, solid, toxic***	2759	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Arsenical pesticide, solid, toxic***	2759	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	1,4-Benzenediol, see **Hydroquinone**											
>												
								☑	☑	☑	☑	☑
*	**Benzyl bromide**	1737	6.1	8	Toxic & Corrosive			II	610 Y610	1 L 0.5 L	612	30 L
≠	**Benzyl bromide**	1737	6.1	8	Toxic & Corrosive			II	610	1 L	612	30 L
								☑	☑	☑	☑	☑
*	**Benzyl chloride**	1738	6.1	8	Toxic & Corrosive			II	610 Y610	1 L 0.5 L	612	30 L
≠	**Benzyl chloride**	1738	6.1	8	Toxic & Corrosive			II	610	1 L	612	30 L
+	**Biological substance, Category B**	3373	6.2		None				See 650		See 650	
							☑					
*	**Bipyridilium pesticide, liquid, toxic***	3016	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Bipyridilium pesticide, liquid, toxic***	3016	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Bipyridilium pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3015	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Bipyridilium pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3015	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Bipyridilium pesticide, solid, toxic***	2781	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Bipyridilium pesticide, solid, toxic***	2781	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Bipyridilium pesticide, toxic, liquid, flammable***, flash point less than 23ºC	2782	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Bipyridilium pesticide, toxic, liquid, flammable***, flash point less than 23ºC	2782	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	Blau gas, see **Carbon monoxide and hydrogen mixture**											
>												
*	**Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water	2880	5.1		Oxidizer	US 4	A135 A136	II III	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		Oxidizer	US 4	A3 A8 A135 A136	II III	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		Oxidizer	US 4	A138	II III	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		Oxidizer	US 4	A3 A8 A135 A136	II III	508 Y508 516 Y516	5 kg 2.5 kg 25 kg 10 kg	511 518	25 kg 100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Carbamate pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2758	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Carbamate pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2758	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Carbamate pesticide, liquid, toxic***	2992	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Carbamate pesticide, liquid, toxic***	2992	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Carbamate pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2991	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Carbamate pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2991	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Carbamate pesticide, solid, toxic***	2757	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Carbamate pesticide, solid, toxic***	2757	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Carbon dioxide and nitrous oxide mixture**	1015	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Carbon dioxide and oxygen mixture, compressed**	1014	2.2	5.1	Gas non-flammable & Oxidizer				200	75 kg	200	150 kg
>												
*	**Carbon monoxide and hydrogen mixture, compressed**	2600	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2		FORBIDDEN		FORBIDDEN	
>												
*	**Carbon monoxide, compressed**	1016	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Carbon monoxide, compressed**	1016	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Carbonyl sulphide**	2204	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Carbonyl sulphide**	2204	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
								☑	☑	☑	☑	☑
*	**Chlorosilanes, corrosive, n.o.s.**	2987	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
≠	**Chlorosilanes, corrosive, n.o.s.**	2987	8		Corrosive			II	808	1 L	812	30 L
								☑	☑	☑	☑	☑
*	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3	Corrosive & Liquid flammable			II	808 Y808	1 L 0.5 L	812	30 L
≠	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3	Corrosive & Liquid flammable			II	808	1 L	812	30 L
								☑	☑	☑	☑	☑
*	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8	Liquid flammable & Corrosive			II	305 Y305	1 L 0.5 L	307	5 L
≠	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8	Liquid flammable & Corrosive			II	305	1 L	307	5 L
								☑	☑	☑	☑	☑
*	**Chlorosilanes, toxic, corrosive, n.o.s.**	3361	6.1	8	Toxic & Corrosive			II	609 Y609	1 L 0.5 L	611	30 L
≠	**Chlorosilanes, toxic, corrosive, n.o.s.**	3361	6.1	8	Toxic & Corrosive			II	609	1 L	611	30 L
								☑	☑	☑	☑	☑
*	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.**	3362	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	609 Y609	1 L 0.5 L	611	30 L
≠	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.**	3362	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	609	1 L	611	30 L
				☑	☑							
*	**Chromium trioxide, anhydrous**	1463	5.1	8	Oxidizer & Corrosive	US 4		II	508 Y508	5 kg 2.5 kg	511	25 kg
≠	**Chromium trioxide, anhydrous**	1463	5.1	6.1 8	Oxidizer & Toxic & Corrosive	US 4		II	508 Y508	5 kg 2.5 kg	511	25 kg
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Clinical specimens**	3373	6.2		None		A141		See 650		See 650	
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Coal gas, compressed** †	1023	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Coal gas, compressed** †	1023	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Coating solution**, (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining) †	1139	3		Liquid flammable		A3 A7	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
≠	**Coating solution**, (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining) †	1139	3		Liquid flammable		A3	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
*	**Compressed gas, n.o.s.***	1956	2.2		Gas non-flammable				200	75 kg	200	150 kg
≠	**Compressed gas, n.o.s.***	1956	2.2		Gas non-flammable		A124		200	75 kg	200	150 kg
*	**Copper based pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2776	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Copper based pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2776	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Copper based pesticide, liquid, toxic***	3010	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Copper based pesticide, liquid, toxic***	3010	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Copper based pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3009	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Copper based pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3009	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Copper based pesticide, solid, toxic***	2775	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Copper based pesticide, solid, toxic***	2775	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Coumarin derivative pesticide, liquid, flammable, toxic***, flash point less than 23ºC	3024	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Coumarin derivative pesticide, liquid, flammable, toxic***, flash point less than 23ºC	3024	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Coumarin derivative pesticide, liquid, toxic***	3026	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Coumarin derivative pesticide, liquid, toxic***	3026	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Coumarin derivative pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3025	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Coumarin derivative pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3025	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Coumarin derivative pesticide, solid, toxic***	3027	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Coumarin derivative pesticide, solid, toxic***	3027	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
+	**Crotonaldehyde**	1143	6.1	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Crotonic acid, liquid**	☑ 2823	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
≠	**Crotonic acid, liquid**	3472	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Diagnostic specimens**	3373	6.2		None		A141		See 650		See 650	
>												
*	p-Dihydroxybenzene, see **Hydroquinone**											
>												
*	**Dimethyldichlorosilane**	1162	3	8	Liquid flammable & Corrosive			II	305 Y305	1 L 0.5 L	307	5 L
≠	**Dimethyldichlorosilane**	1162	3	8	Liquid flammable & Corrosive			II	305	1 L	307	5 L
*	**Engines, internal combustion** (flammable gas powered)	3166	9		Miscellaneous		A67 A70 A87 A121 A134		FORBIDDEN		900	No limit
≠	**Engines, internal combustion, flammable gas powered**	3166	9		Miscellaneous		A67 A70 A87 A134		FORBIDDEN		900	No limit
*	**Engines, internal combustion** (flammable liquid powered)	3166	9		Miscellaneous		A67 A70 A87 A121 A134		900	No limit	900	No limit
≠	**Engines, internal combustion, flammable liquid powered**	3166	9		Miscellaneous		A67 A70 A87 A134		900	No limit	900	No limit
*	**Environmentally hazardous substance, liquid, n.o.s.***	3082	9		Miscellaneous	CA 13 US 4	A97	III	914 Y914	No limit 30 kg G	914	No limit
≠	**Environmentally hazardous substance, liquid, n.o.s.***	3082	9		Miscellaneous	CA 13 US 4	A97 A149	III	914 Y914	450 L 30 kg G	914	450 L
*	**Environmentally hazardous substance, solid, n.o.s.***	3077	9		Miscellaneous	CA 13 US 4	A97	III	911 Y911	No limit 30 kg G	911	No limit
≠	**Environmentally hazardous substance, solid, n.o.s.***	3077	9		Miscellaneous	CA 13 US 4	A97 A149	III	911 Y911	400 kg 30 kg G	911	400 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Ethanol**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethanol**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Ethanol solution**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethanol solution**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Ethyl alcohol**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethyl alcohol**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Ethyl alcohol solution**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethyl alcohol solution**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Ethylene oxide**	1040	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A1 A131		FORBIDDEN		200	25 kg
≠	**Ethylene oxide**	1040	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A2 A131		FORBIDDEN		FORBIDDEN	
*	**Ethylene oxide and carbon dioxide mixture**, with more than 87% ethylene oxide	3300	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A1		FORBIDDEN		200	25 kg
≠	**Ethylene oxide and carbon dioxide mixture**, with more than 87% ethylene oxide	3300	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Ethylene oxide with nitrogen** up to a total pressure of 1 MPa at 50°C	1040	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4	A1		FORBIDDEN		200	25 kg
≠	**Ethylene oxide with nitrogen** up to a total pressure of 1 MPa at 50°C	1040	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Ethyltrichlorosilane**	1196	3	8	Liquid flammable & Corrosive			II	306 Y306	1 L 0.5 L	304	5 L
≠	**Ethyltrichlorosilane**	1196	3	8	Liquid flammable & Corrosive			II	306	1 L	304	5 L
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	Fischer Tropsch gas, see **Carbon monoxide and hydrogen mixture**											
>												
							☑					
*	**Flammable liquid, n.o.s.***	1993	3		Liquid flammable		A3	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
≠	**Flammable liquid, n.o.s.***	1993	3		Liquid flammable		A3 A148	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
	☑											
*	**Formic acid**	1779	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
≠	**Formic acid** with more than 85% acid by mass	1779	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
+	**Formic acid** with not less than 5% but less than 10% acid by mass	3412	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
+	**Formic acid** with not less than 10% but not more than 85% acid by mass	3412	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
+	**Fuel cell cartridges** containing flammable liquids	3473	3		Liquid flammable		A146		313	5 L	313	60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	200	15 kg
≠	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable				203 Y203	1 kg 1 kg	200	15 kg
≠	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		A98		203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	200	15 kg
≠	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	203	15 kg
+	**Genetically modified organisms**	3245	9		Miscellaneous		A47		913	No limit	913	No limit
*	**Hydrazine, aqueous solution** with more than 37% hydrazine by mass	2030	8	6.1	Corrosive & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A7 A36	I II III	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	Corrosive & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A36 A147	I II III	FORBIDDEN FORBIDDEN 818 Y818	 5 L 1 L	809 812 820	2.5 L 30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Hydrogen bromide, anhydrous**	1048	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Hydrogen bromide, anhydrous**	1048	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Hydrogendifluorides, solution, n.o.s.**	1740	8		Corrosive		A3	II III	809 Y809 819 Y819	1 L 0.5 L 5 L 1 L	813 821	30 L 60 L
≠	**Hydrogendifluorides, solution, n.o.s.**	3471	8		Corrosive		A3	II III	809 Y809 819 Y819	1 L 0.5 L 5 L 1 L	813 821	30 L 60 L
*	**Hydrogen in a metal hydride storage system**	3468	2.1				A143		FORBIDDEN		FORBIDDEN	
≠	**Hydrogen in a metal hydride storage system**	3468	2.1		Gas flammable		A1 A143		FORBIDDEN		214	100 kg G
*	**Hydrogen peroxide and peroxyacetic acid mixture** with acid(s), water and not more than 5% peroxyacetic acid, stabilized	3149	5.1	8	Oxidizer & Corrosive		A96	II	501 Y501	1 L 0.5 L	506	5 L
≠	**Hydrogen peroxide and peroxyacetic acid mixture** with acid(s), water and not more than 5% peroxyacetic acid, **stabilized**	3149	5.1	8	Oxidizer & Corrosive		A96	II	501 Y501	1 L 0.5 L	506	5 L
*	Hydroquinol, see **Hydroquinone**											
>												
*	**Hydroquinone, solid**	2662	6.1		Toxic			III	619 Y619	100 kg 10 kg	619	200 kg
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Hydroquinone solution**	3435	6.1		Toxic		A3	III	611 Y611	60 L 2 L	618	220 L
>												
								☑	☑	☑	☑	☑
*	**Isosorbide dinitrate mixture** with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	4.1		Solid flammable	BE 3	A49	II	415 Y415	15 kg 5 kg	417	50 kg
≠	**Isosorbide dinitrate mixture** with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	4.1		Solid flammable	BE 3	A49	II	415	15 kg	417	50 kg
										☑		☑
*	**Lead phosphite, dibasic**	2989	4.1		Solid flammable		A3	II III	415 Y415 419 Y419	5 kg 5 kg 15 kg 10 kg	417 420	25 kg 50 kg
≠	**Lead phosphite, dibasic**	2989	4.1		Solid flammable		A3	II III	415 Y415 419 Y419	15 kg 5 kg 25 kg 10 kg	417 420	50 kg 100 kg
							☑					
*	**Mercury based pesticide, liquid, flammable, toxic***, flash point less than 23°C	2778	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Mercury based pesticide, liquid, flammable, toxic***, flash point less than 23°C	2778	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
							☑					
*	**Mercury based pesticide, liquid, toxic***	3012	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Mercury based pesticide, liquid, toxic***	3012	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Mercury based pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3011	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Mercury based pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3011	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Mercury based pesticide, solid, toxic***	2777	6.1		Toxic		☑ A3 A5 A6	I II III	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 based pesticide, solid, toxic***	2777	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Methacrylic acid, stabilized**	2531	8		Corrosive			II	808 Y808	1 L 0.5 L	812	☑ 60 L
≠	**Methacrylic acid, stabilized**	2531	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
*	**Methyl bromide** with not more than 2% chloropicrin	1062	2.3			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A2 A126		FORBIDDEN		FORBIDDEN	
≠	**Methyl bromide** with not more than 2% chloropicrin	1062	2.3			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	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
*	**Methyl mercaptan**	1064	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Methyl mercaptan**	1064	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Methylphenyldichlorosilane**	2437	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
≠	**Methylphenyldichlorosilane**	2437	8		Corrosive			II	808	1 L	812	30 L
*	**Motor fuel anti-knock mixture**	1649	6.1		Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A127	I	FORBIDDEN		605	30 L
≠	**Motor fuel anti-knock mixture**	1649	6.1		Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A147	I	FORBIDDEN		605	30 L
*	Muriatic acid, see **Hydrochloric acid solution**											
≠	Muriatic acid, see **Hydrochloric acid**											
*	Nitrogen, mixture with rare gases, see **Rare gases and nitrogen mixture**											
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Nitrogen, refrigerated liquid**	1977	2.2		Gas non-flammable		☑		202	50 kg	202	500 kg
≠	**Nitrogen, refrigerated liquid**	1977	2.2		Gas non-flammable		A152		202	50 kg	202	500 kg
*	☑ Nitrous oxide and carbon dioxide mixture, see **Carbon dioxide and nitrous oxide mixture**	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
>												
*	**Organic peroxide type C, liquid***	3103	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	5 L	502	10 L
≠	**Organic peroxide type C, liquid***	3103	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	5 L	502	10 L
*	**Organic peroxide type C, solid***	3104	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	5 kg	513	10 kg
≠	**Organic peroxide type C, solid***	3104	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		510	5 kg	513	10 kg
*	**Organic peroxide type D, liquid***	3105	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	5 L	502	10 L
≠	**Organic peroxide type D, liquid***	3105	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	5 L	502	10 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organic peroxide type D, liquid, temperature controlled***	3115	5.2			AU 1 CA 7 GB 3 NL 1 US 3	☑		FORBIDDEN		FORBIDDEN	
≠	**Organic peroxide type D, liquid, temperature controlled***	3115	5.2			AU 1 CA 7 GB 3 NL 1 US 3	A150		FORBIDDEN		FORBIDDEN	
*	**Organic peroxide type D, solid***	3106	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	5 kg	513	10 kg
≠	**Organic peroxide type D, solid***	3106	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20		510	5 kg	513	10 kg
*	**Organic peroxide type E, liquid***	3107	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	10 L	502	25 L
≠	**Organic peroxide type E, liquid***	3107	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	10 L	502	25 L
*	**Organic peroxide type E, solid***	3108	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	10 kg	513	25 kg
≠	**Organic peroxide type E, solid***	3108	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20		510	10 kg	513	25 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organic peroxide type F, liquid***	3109	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	10 L	502	25 L
≠	**Organic peroxide type F, liquid***	3109	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	10 L	502	25 L
*	**Organic peroxide type F, liquid, temperature controlled***	3119	5.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A2		FORBIDDEN		FORBIDDEN	
≠	**Organic peroxide type F, liquid, temperature controlled***	3119	5.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2 A150		FORBIDDEN		FORBIDDEN	
*	**Organic peroxide type F, solid***	3110	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	10 kg	513	25 kg
≠	**Organic peroxide type F, solid***	3110	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20		510	10 kg	513	25 kg
*	**Organochlorine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2762	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Organochlorine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2762	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
							☑					
*	**Organochlorine pesticide, liquid, toxic***	2996	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organochlorine pesticide, liquid, toxic***	2996	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Organochlorine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2995	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organochlorine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2995	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Organochlorine pesticide, solid, toxic***	2761	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Organochlorine pesticide, solid, toxic***	2761	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
							☑					
*	**Organophosphorus pesticide, liquid, flammable, toxic***, flash point less than 23°C	2784	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Organophosphorus pesticide, liquid, flammable, toxic***, flash point less than 23°C	2784	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organophosphorus pesticide, liquid, toxic***	3018	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organophosphorus pesticide, liquid, toxic***	3018	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Organophosphorus pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3017	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organophosphorus pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3017	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Organophosphorus pesticide, solid, toxic***	2783	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Organophosphorus pesticide, solid, toxic***	2783	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Organotin pesticide, liquid, flammable, toxic***, flash point less than 23°C	2787	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Organotin pesticide, liquid, flammable, toxic***, flash point less than 23°C	2787	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
							☑					
*	**Organotin pesticide, liquid, toxic***	3020	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organotin pesticide, liquid, toxic***	3020	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Organotin pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3019	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organotin pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3019	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Organotin pesticide, solid, toxic***	2786	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Organotin pesticide, solid, toxic***	2786	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	Oxygen and carbon dioxide mixture, see **Carbon dioxide and oxygen mixture**											
>												
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	Oxygen, mixture with rare gases, see **Rare gases and oxygen mixture**											
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
+	**Paint, corrosive, flammable** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	8	3	Corrosive & Liquid flammable		A72	II	808 Y808	1 L 0.5 L	812	30 L
+	**Paint, flammable, corrosive** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	3	8	Liquid flammable & Corrosive		A3 A72	I II III	302 305 Y305 309 Y309	0.5 L 1 L 0.5 L 5 L 1 L	303 307 310	2.5 L 5 L 60 L
+	**Paint related material corrosive, flammable** (including paint thinning or reducing compound)	3470	8	3	Corrosive & Liquid flammable		A72	II	808 Y808	1 L 0.5 L	812	30 L
+	**Paint related material, flammable, corrosive** (including paint thinning or reducing compound)	3469	3	8	Liquid flammable & Corrosive		A3 A72	I II III	302 305 Y305 309 Y309	0.5 L 1 L 0.5 L 5 L 1 L	303 307 310	2.5 L 5 L 60 L
*	**Pesticide, liquid, flammable, toxic, n.o.s.***, flash point less than 23°C	3021	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Pesticide, liquid, flammable, toxic, n.o.s.***, flash point less than 23°C	3021	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Pesticide, liquid, toxic, n.o.s.***	2902	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pesticide, liquid, toxic, n.o.s.***	2902	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑						☑					
*	**Pesticide, liquid, toxic, flammable, n.o.s.***, flash point not less than 23°C	2903	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pesticide, liquid, toxic, flammable, n.o.s.***, flash point not less than 23°C	2903	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Pesticide, solid, toxic, n.o.s.***	2588	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Pesticide, solid, toxic, n.o.s.***	2588	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
	☑						☑					
*	**3356Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic***, flash point less than 23°	3346	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic***, flash point less than 23°C	3346	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
							☑					
*	**Phenoxyacetic acid derivative pesticide, liquid, toxic***	3348	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Phenoxyacetic acid derivative pesticide, liquid, toxic***	3348	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable***, flash point not less than 23°	3347	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3347	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Phenoxyacetic acid derivative pesticide, solid, toxic***	3345	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Phenoxyacetic acid derivative pesticide, solid, toxic***	3345	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
+	**Propionic acid** with not less than 90% acid by mass	3463	8	3	Corrosive & Liquid flammable			II	808 Y808	1 L 0.5 L	812	30 L
*	**Propionic acid**	1848	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
≠	**Propionic acid** with not less than 10% and less than 90% acid by mass	1848	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
*	**Pyrethroid pesticide, liquid flammable, toxic***, flash point less than 23°C	3350	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Pyrethroid pesticide, liquid flammable, toxic***, flash point less than 23°C	3350	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
							☑					
*	**Pyrethroid pesticide, liquid, toxic***	3352	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pyrethroid pesticide, liquid, toxic***	3352	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Pyrethroid pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3351	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pyrethroid pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3351	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
							☑					
*	**Pyrethroid pesticide, solid, toxic***	3349	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Pyrethroid pesticide, solid, toxic***	3349	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	Quinol, see **Hydroquinone**											
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Radioactive material, low specific activity (LSA-I)**, non-fissile or fissile excepted	2912	7		Radioactive	CA 1	☑ A78 A139		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-I)**, non-fissile or fissile excepted	2912	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7		and Part 4;9	
*	**Radioactive material, low specific activity (LSA-II)**, non-fissile or fissile excepted	3321	7		Radioactive	CA 1	☑ A78 A139		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-II)**, non-fissile or fissile excepted	3321	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7		and Part 4;9	
*	**Radioactive material, low specific activity (LSA-II) fissile**	3324	7		Radioactive	CA 1	☑ A78		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-II) fissile**	3324	7		Radioactive	CA 1	A76 A78		See Part 2;7		and Part 4;9	
*	**Radioactive material, low specific activity (LSA-III)**, non-fissile or fissile excepted	3322	7		Radioactive	CA 1	☑ A78 A139		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-III)**, non-fissile or fissile excepted	3322	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7		and Part 4;9	
*	**Radioactive material, low specific activity (LSA-III) fissile**	3325	7		Radioactive	CA 1	☑ A78		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-III) fissile**	3325	7		Radioactive	CA 1	A76 A78		See Part 2;7		and Part 4;9	
*	**Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**	3326	7		Radioactive	CA 1	☑ A78		See Part 2;7		and Part 4;9	
≠	**Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**	3326	7		Radioactive	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	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
*	**Radioactive material, Type A package**, non-special form, non-fissile or fissile excepted	2915	7		Radioactive	CA 1	A78 A139		See Part 2;7		and Part 4;9	
≠	**Radioactive material, Type A package**, non-special form, non-fissile or fissile excepted	2915	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7		and Part 4;9	
*	**Rare gases and nitrogen mixture, compressed**	1981	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Rare gases and oxygen mixture, compressed**	1980	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Rare gases mixture, compressed**	1979	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Receptacles, small, containing gas** (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	200	15 kg
≠	**Receptacles, small, containing gas** (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	203	15 kg
*	**Receptacles, small, containing gas** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable				203 Y203	1 kg 1 kg	200	15 kg
≠	**Receptacles, small, containing gas** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		A98		203 Y203	1 kg 1 kg	203	15 kg
*	**Receptacles, small, containing gas** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	200	15 kg
≠	**Receptacles, small, containing gas** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	203	15 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Silicon tetrafluoride**	1859	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Silicon tetrafluoride**	1859	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Substituted nitrophenol pesticide, liquid, flammable, toxic***, flash point less than 23°C	2780	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Substituted nitrophenol pesticide, liquid, flammable, toxic***, flash point less than 23°C	2780	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Substituted nitrophenol pesticide, liquid, toxic***	3014	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Substituted nitrophenol pesticide, liquid, toxic***	3014	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Substituted nitrophenol pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3013	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Substituted nitrophenol pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3013	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Substituted nitrophenol pesticide, solid, toxic***	2779	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Substituted nitrophenol pesticide, solid, toxic***	2779	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Sulphur**	1350	4.1		Solid flammable		A105	III	419 Y419	20 kg 10 kg	420	100 kg
≠	**Sulphur**	1350	4.1		Solid flammable		A105	III	419 Y419	25 kg 10 kg	420	100 kg
*	**Sulphur dioxide**	1079	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Sulphur dioxide**	1079	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Sulphuryl fluoride**	2191	2.3		Gas toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Sulphuryl fluoride**	2191	2.3			AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	Synthesis gas, see **Carbon monoxide and hydrogen mixture**											
>												
							☑					
*	**Thiocarbamate pesticide, liquid, flammable, toxic***, flash point less than 23°C	2772	3	6.1	Liquid flammable & Toxic			I	FORBIDDEN		303	30 L
								II	305	1 L	307	60 L
									Y305	1 L		
≠	**Thiocarbamate pesticide, liquid, flammable, toxic***, flash point less than 23°C	2772	3	6.1	Liquid flammable & Toxic		A4	I	FORBIDDEN		303	30 L
								II	305	1 L	307	60 L
									Y305	1 L		
							☑					
*	**Thiocarbamate pesticide, liquid, toxic***	3006	6.1		Toxic		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
							A6		Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
≠	**Thiocarbamate pesticide, liquid, toxic***	3006	6.1		Toxic		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
									Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
							☑					
*	**Thiocarbamate pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3005	6.1	3	Toxic & Liquid flammable		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
							A6		Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
≠	**Thiocarbamate pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3005	6.1	3	Toxic & Liquid flammable		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
									Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Thiocarbamate pesticide, solid, toxic***	2771	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Thiocarbamate pesticide, solid, toxic***	2771	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Triazine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2764	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Triazine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2764	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Triazine pesticide, liquid, toxic***	2998	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Triazine pesticide, liquid, toxic***	2998	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Triazine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2997	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Triazine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2997	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
							☑					
*	**Triazine pesticide, solid, toxic***	2763	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Triazine pesticide, solid, toxic***	2763	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
								☑	☑	☑	☑	☑
*	**Trimethylchlorosilane**	1298	3	8	Liquid flammable & Corrosive			II	306 Y306	1 L 0.5 L	304	5 L
≠	**Trimethylchlorosilane**	1298	3	8	Liquid flammable & Corrosive			II	306	1 L	304	5 L
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	Water gas, see **Carbon monoxide and hydrogen mixture**											
>												
								☑	☑	☑	☑	☑
*	**Xylyl bromide, solid**	3417	6.1		Toxic			II	613 Y613	25 kg 1 kg	615	100 kg
≠	**Xylyl bromide, solid**	3417	6.1		Toxic			II	613	25 kg	615	100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	1,4-Benzenediol, see **Hydroquinone**											
>												
*	Blau gas, see **Carbon monoxide and hydrogen mixture**											
>												
*	p-Dihydroxybenzene, see **Hydroquinone**											
>												
*	Fischer Tropsch gas, see **Carbon monoxide and hydrogen mixture**											
>												
*	Hydroquinol, see **Hydroquinone**											
>												
*	Muriatic acid, see **Hydrochloric acid solution**											
≠	Muriatic acid, see **Hydrochloric acid**											
*	Nitrogen, mixture with rare gases, see **Rare gases and nitrogen mixture**											
>												
*	Nitrous oxide and carbon dioxide mixture, see **Carbon dioxide and nitrous oxide mixture**											
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	Oxygen and carbon dioxide mixture, see **Carbon dioxide and oxygen mixture**											
>												
*	Oxygen, mixture with rare gases, see **Rare gases and oxygen mixture**											
>												
*	Quinol, see **Hydroquinone**											
>												
*	Synthesis gas, see **Carbon monoxide and hydrogen mixture**											
>												
*	Water gas, see **Carbon monoxide and hydrogen mixture**											
>												
*	**Ammonia, anhydrous**	1005	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A126		FORBIDDEN		200	25 kg
≠	**Ammonia, anhydrous**	1005	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2		FORBIDDEN		FORBIDDEN	
*	**Carbon dioxide and oxygen mixture, compressed**	1014	2.2	5.1	Gas non-flammable & Oxidizer				200	75 kg	200	150 kg
>												

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Carbon dioxide and nitrous oxide mixture**	1015	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Carbon monoxide, compressed**	1016	2.3	2.1	☑ Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	☑ A1		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Carbon monoxide, compressed**	1016	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Coal gas, compressed** †	1023	2.3	2.1	☑ Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	☑ A1		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Coal gas, compressed** †	1023	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Ethylene oxide**	1040	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A1 A131		FORBIDDEN		200	25 kg
≠	**Ethylene oxide**	1040	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A2 A131		FORBIDDEN		FORBIDDEN	
*	**Ethylene oxide with nitrogen** up to a total pressure of 1 MPa at 50°C	1040	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4	A1		FORBIDDEN		200	25 kg
≠	**Ethylene oxide with nitrogen** up to a total pressure of 1 MPa at 50°C	1040	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4	A2		FORBIDDEN		FORBIDDEN	
*	**Hydrogen bromide, anhydrous**	1048	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Hydrogen bromide, anhydrous**	1048	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Methyl bromide** with not more than 2% chloropicrin	1062	2.3			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A2 A126		FORBIDDEN		FORBIDDEN	
≠	**Methyl bromide** with not more than 2% chloropicrin	1062	2.3			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2		FORBIDDEN		FORBIDDEN	
*	**Methyl mercaptan**	1064	2.3	2.1	☑ Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	☑ A1		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Methyl mercaptan**	1064	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Sulphur dioxide**	1079	2.3	8	☑ Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	☑ A1		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Sulphur dioxide**	1079	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Coating solution**, (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining) †	1139	3		Liquid flammable		☑ A3 A7	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
≠	**Coating solution**, (includes surface treatments or coatings used for industrial or other purposes such as vehicle undercoating, drum or barrel lining) †	1139	3		Liquid flammable		A3	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
+	**Crotonaldehyde**	1143	6.1	3		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Dimethyldichlorosilane**	1162	3	8	Liquid flammable & Corrosive			☑ II	☑ 305 Y305	☑ 1 L 0.5 L	☑ 307	☑ 5 L
≠	**Dimethyldichlorosilane**	1162	3	8	Liquid flammable & Corrosive			II	305	1 L	307	5 L
*	**Ethanol**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethanol**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Ethanol solution**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethanol solution**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Ethyl alcohol**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethyl alcohol**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Ethyl alcohol solution**	1170	3		Liquid flammable		☑ A3 A58	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Ethyl alcohol solution**	1170	3		Liquid flammable		A3 A58 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
*	**Ethyltrichlorosilane**	1196	3	8	Liquid flammable & Corrosive			☑ II	☑ 306 Y306	☑ 1 L 0.5 L	☑ 304	☑ 5 L
≠	**Ethyltrichlorosilane**	1196	3	8	Liquid flammable & Corrosive			II	306	1 L	304	5 L
*	**Trimethylchlorosilane**	1298	3	8	Liquid flammable & Corrosive			☑ II	☑ 306 Y306	☑ 1 L 0.5 L	☑ 304	☑ 5 L
≠	**Trimethylchlorosilane**	1298	3	8	Liquid flammable & Corrosive			II	306	1 L	304	5 L
*	**Sulphur**	1350	4.1		Solid flammable		A105	III	419 Y419	☑ 20 kg 10 kg	420	100 kg
≠	**Sulphur**	1350	4.1		Solid flammable		A105	III	419 Y419	25 kg 10 kg	420	100 kg
*	**Alkali metal dispersion**	1391	4.3		Danger if wet		☑ A63 A84	I	FORBIDDEN		409	1 L
≠	**Alkali metal dispersion**	1391	4.3		Danger if wet		A84 A147	I	FORBIDDEN		409	1 L
*	**Alkaline earth metal dispersion**	1391	4.3		Danger if wet		☑ A63 A85	I	FORBIDDEN		409	1 L
≠	**Alkaline earth metal dispersion**	1391	4.3		Danger if wet		A85 A147	I	FORBIDDEN		409	1 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
				☑	☑							
*	**Chromium trioxide, anhydrous**	1463	5.1	8	Oxidizer & Corrosive	US 4		II	508 Y508	5 kg 2.5 kg	511	25 kg
≠	**Chromium trioxide, anhydrous**	1463	5.1	6.1 8	Oxidizer & Toxic & Corrosive	US 4		II	508 Y508	5 kg 2.5 kg	511	25 kg
							☑					
*	**Motor fuel anti-knock mixture**	1649	6.1		Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A127	I	FORBIDDEN		605	30 L
≠	**Motor fuel anti-knock mixture**	1649	6.1		Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A147	I	FORBIDDEN		605	30 L
								☑	☑	☑	☑	☑
*	**Benzyl bromide**	1737	6.1	8	Toxic & Corrosive			II	610 Y610	1 L 0.5 L	612	30 L
≠	**Benzyl bromide**	1737	6.1	8	Toxic & Corrosive			II	610	1 L	612	30 L
								☑	☑	☑	☑	☑
*	**Benzyl chloride**	1738	6.1	8	Toxic & Corrosive			II	610 Y610	1 L 0.5 L	612	30 L
≠	**Benzyl chloride**	1738	6.1	8	Toxic & Corrosive			II	610	1 L	612	30 L
	☑											
*	**Formic acid**	1779	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
≠	**Formic acid** with more than 85% acid by mass	1779	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
	☑											
*	**Propionic acid**	1848	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
≠	**Propionic acid** with not less than 10% and less than 90% acid by mass	1848	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Silicon tetrafluoride**	1859	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Silicon tetrafluoride**	1859	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Aerosols**, flammable	1950	2.1		Gas flammable				203 Y203	75 kg 30 kg G	203	150 kg
≠	**Aerosols**, flammable	1950	2.1		Gas flammable		A145		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	Gas flammable & Corrosive				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	Gas flammable & Corrosive		A145		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	Gas flammable & Toxic				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	Gas flammable & Toxic		A145		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	Gas flammable & Toxic & Corrosive				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	Gas flammable & Toxic & Corrosive		A145		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	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
*	**Aerosols**, flammable (engine starting fluid)	1950	2.1		Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1		FORBIDDEN		203	150 kg
≠	**Aerosols**, flammable (engine starting fluid)	1950	2.1		Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145		FORBIDDEN		203	150 kg
*	**Aerosols**, non-flammable	1950	2.2		Gas non-flammable		☑ A98		203 or 204 Y203 or Y204	75 kg 30 kg G	203 or 204	150 kg
≠	**Aerosols**, non-flammable	1950	2.2		Gas non-flammable		A98 A145		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	Gas non-flammable & Corrosive		☑		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	Gas non-flammable & Corrosive		A145		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	Gas non-flammable & Toxic		☑		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	Gas non-flammable & Toxic		A145		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	Gas non-flammable & Toxic & Corrosive		☑		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	Gas non-flammable & Toxic & Corrosive		A145		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	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
*	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1		FORBIDDEN		212	50 kg
≠	**Aerosols**, non-flammable, (tear gas devices)	1950	2.2	6.1	Gas non-flammable & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A145		FORBIDDEN		212	50 kg
+	**Aerosols**, oxidizing	1950	2.2	5.1	Gas non-flammable & Oxidizer				203	75 kg	203	150 kg
*	**Compressed gas, n.o.s.***	1956	2.2		Gas non-flammable		☑		200	75 kg	200	150 kg
≠	**Compressed gas, n.o.s.***	1956	2.2		Gas non-flammable		A124		200	75 kg	200	150 kg
*	**Nitrogen, refrigerated liquid**	1977	2.2		Gas non-flammable		☑		202	50 kg	202	500 kg
≠	**Nitrogen, refrigerated liquid**	1977	2.2		Gas non-flammable		A152		202	50 kg	202	500 kg
*	**Rare gases mixture, compressed**	1979	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Rare gases and oxygen mixture, compressed**	1980	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Rare gases and nitrogen mixture, compressed**	1981	2.2		Gas non-flammable				200	75 kg	200	150 kg
>												
*	**Alcohols, n.o.s.***	1987	3		Liquid flammable		☑ A3	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L
≠	**Alcohols, n.o.s.***	1987	3		Liquid flammable		A3 A148	II III	305 Y305 309 Y309	5 L 1 L 60 L 10 L	307 310	60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Flammable liquid, n.o.s.***	1993	3		Liquid flammable		☑ A3	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
≠	**Flammable liquid, n.o.s.***	1993	3		Liquid flammable		A3 A148	I II III	302 305 Y305 309 Y309	1 L 5 L 1 L 60 L 10 L	303 307 310	30 L 60 L 220 L
*	**Hydrazine, aqueous solution** with more than 37% hydrazine by mass	2030	8	6.1	Corrosive & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A1 A7 A36	I II III	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	Corrosive & Toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A36 A147	I II III	FORBIDDEN FORBIDDEN 818 Y818	 5 L 1 L	809 812 820	2.5 L 30 L 60 L
*	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	☑ 200	15 kg
≠	**Gas cartridges**, (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		☑		203 Y203	1 kg 1 kg	☑ 200	15 kg
≠	**Gas cartridges** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		A98		203 Y203	1 kg 1 kg	203	15 kg
*	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	☑ 200	15 kg
≠	**Gas cartridges** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	203	15 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Receptacles, small, containing gas** (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	200	15 kg
≠	**Receptacles, small, containing gas** (flammable) without a release device, non-refillable	2037	2.1		Gas flammable				203 Y203	1 kg 1 kg	203	15 kg
*	**Receptacles, small, containing gas** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		☑		203 Y203	1 kg 1 kg	200	15 kg
≠	**Receptacles, small, containing gas** (non-flammable) without a release device, non-refillable	2037	2.2		Gas non-flammable		A98		203 Y203	1 kg 1 kg	203	15 kg
*	**Receptacles, small, containing gas** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	200	15 kg
≠	**Receptacles, small, containing gas** (oxidizing) without a release device, non-refillable	2037	2.2	5.1	Gas non-flammable & Oxidizer				203	1 kg	203	15 kg
*	**Sulphuryl fluoride**	2191	2.3		☑ Gas toxic	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	☑ A1		FORBIDDEN		☑ 200	☑ 25 kg
≠	**Sulphuryl fluoride**	2191	2.3			AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Carbonyl sulphide**	2204	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A1		FORBIDDEN		200	25 kg
≠	**Carbonyl sulphide**	2204	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Methylphenyldichlorosilane**	2437	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
≠	**Methylphenyldichlorosilane**	2437	8		Corrosive			II	808	1 L	812	30 L
*	**Methacrylic acid, stabilized**	2531	8		Corrosive			II	808 Y808	1 L 0.5 L	812	60 L
≠	**Methacrylic acid, stabilized**	2531	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
*	**Pesticide, solid, toxic, n.o.s.***	2588	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Pesticide, solid, toxic, n.o.s.***	2588	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Carbon monoxide and hydrogen mixture, compressed**	2600	2.3	2.1		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	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
*	**Hydroquinone, solid**	2662	6.1		Toxic			III	619 Y619	100 kg 10 kg	619	200 kg
>												
*	**Carbamate pesticide, solid, toxic***	2757	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Carbamate pesticide, solid, toxic***	2757	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Carbamate pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2758	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Carbamate pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2758	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Arsenical pesticide, solid, toxic***	2759	6.1		Toxic		A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Arsenical pesticide, solid, toxic***	2759	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Arsenical pesticide, liquid, flammable, toxic*,** flash point less than 23ºC	2760	3	6.1	Liquid flammable & Toxic			I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Arsenical pesticide, liquid, flammable, toxic*,** flash point less than 23ºC	2760	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organochlorine pesticide, solid, toxic***	2761	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Organochlorine pesticide, solid, toxic***	2761	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Organochlorine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2762	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Organochlorine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2762	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Triazine pesticide, solid, toxic***	2763	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Triazine pesticide, solid, toxic***	2763	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Triazine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2764	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Triazine pesticide, liquid, flammable, toxic***, flash point less than 23°C	2764	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Thiocarbamate pesticide, solid, toxic***	2771	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Thiocarbamate pesticide, solid, toxic***	2771	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Thiocarbamate pesticide, liquid, flammable, toxic***, flash point less than 23°C	2772	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Thiocarbamate pesticide, liquid, flammable, toxic***, flash point less than 23°C	2772	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Copper based pesticide, solid, toxic***	2775	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Copper based pesticide, solid, toxic***	2775	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Copper based pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2776	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Copper based pesticide, liquid, flammable, toxic***, flash point less than 23ºC	2776	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Mercury based pesticide, solid, toxic***	2777	6.1		Toxic		☑ A3 A5 A6	I II III	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 based pesticide, solid, toxic***	2777	6.1		Toxic		A3 A5	I II III	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 based pesticide, liquid, flammable, toxic***, flash point less than 23°C	2778	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Mercury based pesticide, liquid, flammable, toxic***, flash point less than 23°C	2778	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Substituted nitrophenol pesticide, solid, toxic***	2779	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Substituted nitrophenol pesticide, solid, toxic***	2779	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Substituted nitrophenol pesticide, liquid, flammable, toxic***, flash point less than 23°C	2780	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Substituted nitrophenol pesticide, liquid, flammable, toxic***, flash point less than 23°C	2780	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Bipyridilium pesticide, solid, toxic***	2781	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Bipyridilium pesticide, solid, toxic***	2781	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Bipyridilium pesticide, toxic, liquid, flammable***, flash point less than 23ºC	2782	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Bipyridilium pesticide, toxic, liquid, flammable***, flash point less than 23ºC	2782	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Organophosphorus pesticide, solid, toxic***	2783	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Organophosphorus pesticide, solid, toxic***	2783	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Organophosphorus pesticide, liquid, flammable, toxic***, flash point less than 23°C	2784	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Organophosphorus pesticide, liquid, flammable, toxic***, flash point less than 23°C	2784	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organotin pesticide, solid, toxic***	2786	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Organotin pesticide, solid, toxic***	2786	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Organotin pesticide, liquid, flammable, toxic***, flash point less than 23°C	2787	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Organotin pesticide, liquid, flammable, toxic***, flash point less than 23°C	2787	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Calcium hypochlorite, hydrated** with not less than 5.5% but not more than 16% water	2880	5.1		Oxidizer	US 4	☑ A135 A136	II III	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		Oxidizer	US 4	A3 A8 A135 A136	II III	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		Oxidizer	US 4	☑ A138	II III	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		Oxidizer	US 4	A3 A8 A135 A136	II III	508 Y508 516 Y516	5 kg 2.5 kg 25 kg 10 kg	511 518	25 kg 100 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
							☑					
*	**Pesticide, liquid, toxic, n.o.s.***	2902	6.1		Toxic		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pesticide, liquid, toxic, n.o.s.***	2902	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
	☑						☑					
*	**Pesticide, liquid, toxic, flammable, n.o.s.***, flash point not less than 23°C	2903	6.1	3	Toxic & Liquid flammable		A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pesticide, liquid, toxic, flammable, n.o.s.***, flash point not less than 23°C	2903	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
								☑	☑	☑	☑	☑
*	**Isosorbide dinitrate mixture** with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	4.1		Solid flammable	BE 3	A49	II	415 Y415	15 kg 5 kg	417	50 kg
≠	**Isosorbide dinitrate mixture** with not less than 60% lactose, mannose, starch or calcium hydrogen phosphate	2907	4.1		Solid flammable	BE 3	A49	II	415	15 kg	417	50 kg
							☑					
*	**Radioactive material, low specific activity (LSA-I)**, non-fissile or fissile excepted	2912	7		Radioactive	CA 1	A78 A139		See Part 2;7 and Part 4;9			
≠	**Radioactive material, low specific activity (LSA-I)**, non-fissile or fissile excepted	2912	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7 and Part 4;9			

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Radioactive material, Type A package**, non-special form, non-fissile or fissile excepted	2915	7		Radioactive	CA 1	☑ A78 A139		See Part 2;7 and Part 4;9			
≠	**Radioactive material, Type A package**, non-special form, non-fissile or fissile excepted	2915	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7 and Part 4;9			
*	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8	Liquid flammable & Corrosive			☑ II	☑ 305 Y305	☑ 1 L 0.5 L	☑ 307	☑ 5 L
≠	**Chlorosilanes, flammable, corrosive, n.o.s.**	2985	3	8	Liquid flammable & Corrosive			II	305	1 L	307	5 L
*	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3	Corrosive & Liquid flammable			☑ II	☑ 808 Y808	☑ 1 L 0.5 L	☑ 812	☑ 30 L
≠	**Chlorosilanes, corrosive, flammable, n.o.s.**	2986	8	3	Corrosive & Liquid flammable			II	808	1 L	812	30 L
*	**Chlorosilanes, corrosive, n.o.s.**	2987	8		Corrosive			☑ II	☑ 808 Y808	☑ 1 L 0.5 L	☑ 812	☑ 30 L
≠	**Chlorosilanes, corrosive, n.o.s.**	2987	8		Corrosive			II	808	1 L	812	30 L
*	**Lead phosphite, dibasic**	2989	4.1		Solid flammable		A3	II III	415 Y415 419 Y419	☑ 5 kg 5 kg 15 kg 10 kg	417 420	☑ 25 kg 50 kg
≠	**Lead phosphite, dibasic**	2989	4.1		Solid flammable		A3	II III	415 Y415 419 Y419	15 kg 5 kg 25 kg 10 kg	417 420	50 kg 100 kg
*	**Carbamate pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2991	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Carbamate pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2991	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Carbamate pesticide, liquid, toxic***	2992	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Carbamate pesticide, liquid, toxic***	2992	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Arsenical pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2993	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Arsenical pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	2993	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Arsenical pesticide, liquid, toxic***	2994	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Arsenical pesticide, liquid, toxic***	2994	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Organochlorine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2995	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organochlorine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2995	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organochlorine pesticide, liquid, toxic***	2996	6.1		Toxic		☑ A3 A4 A6	 I II III	 603 609 Y609 611 Y611	 1 L 5 L 1 L 60 L 2 L	 604 611 618	 30 L 60 L 220 L
≠	**Organochlorine pesticide, liquid, toxic***	2996	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Triazine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2997	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	 I II III	 603 609 Y609 611 Y611	 1 L 5 L 1 L 60 L 2 L	 604 611 618	 30 L 60 L 220 L
≠	**Triazine pesticide, liquid, toxic, flammable***, flash point not less than 23°C	2997	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Triazine pesticide, liquid, toxic***	2998	6.1		Toxic		☑ A3 A4 A6	 I II III	 603 609 Y609 611 Y611	 1 L 5 L 1 L 60 L 2 L	 604 611 618	 30 L 60 L 220 L
≠	**Triazine pesticide, liquid, toxic***	2998	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Thiocarbamate pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3005	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	 I II III	 603 609 Y609 611 Y611	 1 L 5 L 1 L 60 L 2 L	 604 611 618	 30 L 60 L 220 L
≠	**Thiocarbamate pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3005	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Thiocarbamate pesticide, liquid, toxic***	3006	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Thiocarbamate pesticide, liquid, toxic***	3006	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Copper based pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3009	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Copper based pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3009	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Copper based pesticide, liquid, toxic***	3010	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Copper based pesticide, liquid, toxic***	3010	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Mercury based pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3011	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Mercury based pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3011	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Mercury based pesticide, liquid, toxic***	3012	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Mercury based pesticide, liquid, toxic***	3012	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Substituted nitrophenol pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3013	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Substituted nitrophenol pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3013	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Substituted nitrophenol pesticide, liquid, toxic***	3014	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Substituted nitrophenol pesticide, liquid, toxic***	3014	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Bipyridilium pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3015	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Bipyridilium pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3015	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Bipyridilium pesticide, liquid, toxic***	3016	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Bipyridilium pesticide, liquid, toxic***	3016	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Organophosphorus pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3017	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organophosphorus pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3017	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Organophosphorus pesticide, liquid, toxic***	3018	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organophosphorus pesticide, liquid, toxic***	3018	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Organotin pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3019	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organotin pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3019	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organotin pesticide, liquid, toxic***	3020	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Organotin pesticide, liquid, toxic***	3020	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Pesticide, liquid, flammable, toxic, n.o.s.***, flash point less than 23°C	3021	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Pesticide, liquid, flammable, toxic, n.o.s.***, flash point less than 23°C	3021	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Coumarin derivative pesticide, liquid, flammable, toxic***, flash point less than 23ºC	3024	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Coumarin derivative pesticide, liquid, flammable, toxic***, flash point less than 23ºC	3024	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Coumarin derivative pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3025	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Coumarin derivative pesticide, liquid, toxic, flammable***, flash point not less than 23ºC	3025	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Coumarin derivative pesticide, liquid, toxic***	3026	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Coumarin derivative pesticide, liquid, toxic***	3026	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Coumarin derivative pesticide, solid, toxic***	3027	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Coumarin derivative pesticide, solid, toxic***	3027	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
*	**Environmentally hazardous substance, solid, n.o.s.***	3077	9		Miscellaneous	CA 13 US 4	☑ A97	III	911 Y911	☑ No limit 30 kg G	911	☑ No limit
≠	**Environmentally hazardous substance, solid, n.o.s.***	3077	9		Miscellaneous	CA 13 US 4	A97 A149	III	911 Y911	400 kg 30 kg G	911	400 kg
*	**Environmentally hazardous substance, liquid, n.o.s.***	3082	9		Miscellaneous	CA 13 US 4	☑ A97	III	914 Y914	☑ No limit 30 kg G	914	☑ No limit
≠	**Environmentally hazardous substance, liquid, n.o.s.***	3082	9		Miscellaneous	CA 13 US 4	A97 A149	III	914 Y914	450 L 30 kg G	914	450 L
*	**Organic peroxide type C, liquid***	3103	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	5 L	502	10 L
≠	**Organic peroxide type C, liquid***	3103	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	5 L	502	10 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organic peroxide type C, solid***	3104	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	5 kg	513	10 kg
≠	**Organic peroxide type C, solid***	3104	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		510	5 kg	513	10 kg
*	**Organic peroxide type D, liquid***	3105	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	5 L	502	10 L
≠	**Organic peroxide type D, liquid***	3105	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	5 L	502	10 L
*	**Organic peroxide type D, solid***	3106	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	5 kg	513	10 kg
≠	**Organic peroxide type D, solid***	3106	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20		510	5 kg	513	10 kg
*	**Organic peroxide type E, liquid***	3107	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	10 L	502	25 L
≠	**Organic peroxide type E, liquid***	3107	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	10 L	502	25 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organic peroxide type E, solid***	3108	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	10 kg	513	25 kg
≠	**Organic peroxide type E, solid***	3108	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20		510	10 kg	513	25 kg
*	**Organic peroxide type F, liquid***	3109	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		500	10 L	502	25 L
≠	**Organic peroxide type F, liquid***	3109	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20 A150		500	10 L	502	25 L
*	**Organic peroxide type F, solid***	3110	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	☑ A20		510	10 kg	513	25 kg
≠	**Organic peroxide type F, solid***	3110	5.2		Organic peroxide	AU 1 CA 7 GB 3 NL 1 US 3	A14 A20		510	10 kg	513	25 kg
*	**Organic peroxide type D, liquid, temperature controlled***	3115	5.2			AU 1 CA 7 GB 3 NL 1 US 3	☑		FORBIDDEN		FORBIDDEN	
≠	**Organic peroxide type D, liquid, temperature controlled***	3115	5.2			AU 1 CA 7 GB 3 NL 1 US 3	A150		FORBIDDEN		FORBIDDEN	

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Organic peroxide type F, liquid, temperature controlled***	3119	5.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	☑ A2		FORBIDDEN		FORBIDDEN	
≠	**Organic peroxide type F, liquid, temperature controlled***	3119	5.2			AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2 A150		FORBIDDEN		FORBIDDEN	
*	☑ **Hydrogen peroxide and peroxyacetic acid mixture** with acid(s), water and not more than 5% peroxyacetic acid, stabilized	3149	5.1	8	Oxidizer & Corrosive		A96	II	501 Y501	1 L 0.5 L	506	5 L
≠	**Hydrogen peroxide and peroxyacetic acid mixture** with acid(s), water and not more than 5% peroxyacetic acid, **stabilized**	3149	5.1	8	Oxidizer & Corrosive		A96	II	501 Y501	1 L 0.5 L	506	5 L
*	☑ **Engines, internal combustion** (flammable gas powered)	3166	9		Miscellaneous		☑ A67 A70 A87 A121 A134		FORBIDDEN		900	No limit
≠	**Engines, internal combustion, flammable gas powered**	3166	9		Miscellaneous		A67 A70 A87 A134		FORBIDDEN		900	No limit
*	☑ **Engines, internal combustion** (flammable liquid powered)	3166	9		Miscellaneous		☑ A67 A70 A87 A121 A134		900	No limit	900	No limit
≠	**Engines, internal combustion, flammable liquid powered**	3166	9		Miscellaneous		A67 A70 A87 A134		900	No limit	900	No limit
+	**Genetically modified organisms**	3245	9		Miscellaneous		A47		913	No limit	913	No limit

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Ethylene oxide and carbon dioxide mixture**, with more than 87% ethylene oxide	3300	2.3	2.1	Gas toxic & Gas flammable	AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A1		FORBIDDEN		200	25 kg
≠	**Ethylene oxide and carbon dioxide mixture**, with more than 87% ethylene oxide	3300	2.3	2.1		AU 1 CA 7 GB 3 IR 3 NL 1 US 3 US 4 US 8	A2		FORBIDDEN		FORBIDDEN	
*	**Ammonia solution**, relative density less than 0.880 at 15ºC in water, with more than 50% ammonia	3318	2.3	8	Gas toxic & Corrosive	AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A1 A126		FORBIDDEN		200	25 kg
≠	**Ammonia solution**, relative density less than 0.880 at 15ºC in water, with more than 50% ammonia	3318	2.3	8		AU 1 CA 7 GB 3 IR 3 NL 1 US 3	A2		FORBIDDEN		FORBIDDEN	
*	**Radioactive material, low specific activity (LSA-II)**, non-fissile or fissile excepted	3321	7		Radioactive	CA 1	A78 A139		See Part 2;7	and Part 4;9		
≠	**Radioactive material, low specific activity (LSA-II)**, non-fissile or fissile excepted	3321	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7	and Part 4;9		

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Radioactive material, low specific activity (LSA-III)**, non-fissile or fissile excepted	3322	7		Radioactive	CA 1	☑ A78 A139		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-III)**, non-fissile or fissile excepted	3322	7		Radioactive	CA 1	A23 A78 A139		See Part 2;7		and Part 4;9	
*	**Radioactive material, low specific activity (LSA-II) fissile**	3324	7		Radioactive	CA 1	☑ A78		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-II) fissile**	3324	7		Radioactive	CA 1	A76 A78		See Part 2;7		and Part 4;9	
*	**Radioactive material, low specific activity (LSA-III) fissile**	3325	7		Radioactive	CA 1	☑ A78		See Part 2;7		and Part 4;9	
≠	**Radioactive material, low specific activity (LSA-III) fissile**	3325	7		Radioactive	CA 1	A76 A78		See Part 2;7		and Part 4;9	
*	**Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**	3326	7		Radioactive	CA 1	☑ A78		See Part 2;7		and Part 4;9	
≠	**Radioactive material, surface contaminated objects (SCO-I** or **SCO-II), fissile**	3326	7		Radioactive	CA 1	A76 A78		See Part 2;7		and Part 4;9	
*	**Phenoxyacetic acid derivative pesticide, solid, toxic***	3345	6.1		Toxic		☑ A3 A5 A6	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg
≠	**Phenoxyacetic acid derivative pesticide, solid, toxic***	3345	6.1		Toxic		A3 A5	I II III	606 613 Y613 619 Y619	5 kg 25 kg 1 kg 100 kg 10 kg	607 615 619	50 kg 100 kg 200 kg

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑						☑					
*	**3356Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic***, flash point less than 23°	3346	3	6.1	Liquid flammable & Toxic			I	FORBIDDEN		303	30 L
								II	305	1 L	307	60 L
									Y305	1 L		
≠	**Phenoxyacetic acid derivative pesticide, liquid, flammable, toxic***, flash point less than 23°C	3346	3	6.1	Liquid flammable & Toxic		A4	I	FORBIDDEN		303	30 L
								II	305	1 L	307	60 L
									Y305	1 L		
	☑						☑					
*	**Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable***, flash point not less than 23°	3347	6.1	3	Toxic & Liquid flammable		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
							A6		Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
≠	**Phenoxyacetic acid derivative pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3347	6.1	3	Toxic & Liquid flammable		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
									Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
							☑					
*	**Phenoxyacetic acid derivative pesticide, liquid, toxic***	3348	6.1		Toxic		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
							A6		Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
≠	**Phenoxyacetic acid derivative pesticide, liquid, toxic***	3348	6.1		Toxic		A3	I	603	1 L	604	30 L
							A4	II	609	5 L	611	60 L
									Y609	1 L		
								III	611	60 L	618	220 L
									Y611	2 L		
							☑					
*	**Pyrethroid pesticide, solid, toxic***	3349	6.1		Toxic		A3	I	606	5 kg	607	50 kg
							A5	II	613	25 kg	615	100 kg
							A6		Y613	1 kg		
								III	619	100 kg	619	200 kg
									Y619	10 kg		
≠	**Pyrethroid pesticide, solid, toxic***	3349	6.1		Toxic		A3	I	606	5 kg	607	50 kg
							A5	II	613	25 kg	615	100 kg
									Y613	1 kg		
								III	619	100 kg	619	200 kg
									Y619	10 kg		

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
*	**Pyrethroid pesticide, liquid flammable, toxic***, flash point less than 23°C	3350	3	6.1	Liquid flammable & Toxic		☑	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
≠	**Pyrethroid pesticide, liquid flammable, toxic***, flash point less than 23°C	3350	3	6.1	Liquid flammable & Toxic		A4	I II	FORBIDDEN 305 Y305	 1 L 1 L	303 307	30 L 60 L
*	**Pyrethroid pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3351	6.1	3	Toxic & Liquid flammable		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pyrethroid pesticide, liquid, toxic, flammable***, flash point not less than 23°C	3351	6.1	3	Toxic & Liquid flammable		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Pyrethroid pesticide, liquid, toxic***	3352	6.1		Toxic		☑ A3 A4 A6	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
≠	**Pyrethroid pesticide, liquid, toxic***	3352	6.1		Toxic		A3 A4	I II III	603 609 Y609 611 Y611	1 L 5 L 1 L 60 L 2 L	604 611 618	30 L 60 L 220 L
*	**Chlorosilanes, toxic, corrosive, n.o.s.**	3361	6.1	8	Toxic & Corrosive			☑ II	☑ 609 Y609	☑ 1 L 0.5 L	☑ 611	☑ 30 L
≠	**Chlorosilanes, toxic, corrosive, n.o.s.**	3361	6.1	8	Toxic & Corrosive			II	609	1 L	611	30 L
*	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.**	3362	6.1	3 8	Toxic & Liquid flammable & Corrosive			☑ II	☑ 609 Y609	☑ 1 L 0.5 L	☑ 611	☑ 30 L
≠	**Chlorosilanes, toxic, corrosive, flammable, n.o.s.**	3362	6.1	3 8	Toxic & Liquid flammable & Corrosive			II	609	1 L	611	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Diagnostic specimens**	3373	6.2		None		A141		See 650		See 650	
>												
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Clinical specimens**	3373	6.2		None		A141		See 650		See 650	
>												
+	**Biological substance, Category B**	3373	6.2		None				See 650		See 650	
+	**Formic acid** with not less than 10% but not more than 85% acid by mass	3412	8		Corrosive			II	808 Y808	1 L 0.5 L	812	30 L
+	**Formic acid** with not less than 5% but less than 10% acid by mass	3412	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
								☑	☑	☑	☑	☑
*	**Xylyl bromide, solid**	3417	6.1		Toxic			II	613 Y613	25 kg 1 kg	615	100 kg
≠	**Xylyl bromide, solid**	3417	6.1		Toxic			II	613	25 kg	615	100 kg
	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
*	**Hydroquinone solution**	3435	6.1		Toxic		A3	III	611 Y611	60 L 2 L	618	220 L
>												
+	**Propionic acid** with not less than 90% acid by mass	3463	8	3	Corrosive & Liquid flammable			II	808 Y808	1 L 0.5 L	812	30 L
					☑		☑				☑	☑
*	**Hydrogen in a metal hydride storage system**	3468	2.1				A143		FORBIDDEN		FORBIDDEN	
≠	**Hydrogen in a metal hydride storage system**	3468	2.1		Gas flammable		A1 A143		FORBIDDEN		214	100 kg G
+	**Paint, flammable, corrosive** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3469	3	8	Liquid flammable & Corrosive		A3 A72	I II III	302 305 Y305 309 Y309	0.5 L 1 L 0.5 L 5 L 1 L	303 307 310	2.5 L 5 L 60 L
+	**Paint related material, flammable, corrosive** (including paint thinning or reducing compound)	3469	3	8	Liquid flammable & Corrosive		A3 A72	I II III	302 305 Y305 309 Y309	0.5 L 1 L 0.5 L 5 L 1 L	303 307 310	2.5 L 5 L 60 L
+	**Paint, corrosive, flammable** (including paint, lacquer, enamel, stain, shellac, varnish, polish, liquid filler and liquid lacquer base)	3470	8	3	Corrosive & Liquid flammable		A72	II	808 Y808	1 L 0.5 L	812	30 L

	Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	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
+	**Paint related material corrosive, flammable** (including paint thinning or reducing compound)	3470	8	3	Corrosive & Liquid flammable		A72	II	808 Y808	1 L 0.5 L	812	30 L
*	**Hydrogendifluorides, solution, n.o.s.**	☑ 1740	8		Corrosive		A3	II III	809 Y809 819 Y819	1 L 0.5 L 5 L 1 L	813 821	30 L 60 L
≠	**Hydrogendifluorides, solution, n.o.s.**	3471	8		Corrosive		A3	II III	809 Y809 819 Y819	1 L 0.5 L 5 L 1 L	813 821	30 L 60 L
*	**Crotonic acid, liquid**	☑ 2823	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
≠	**Crotonic acid, liquid**	3472	8		Corrosive			III	818 Y818	5 L 1 L	820	60 L
+	**Fuel cell cartridges** containing flammable liquids	3473	3		Liquid flammable		A146		313	5 L	313	60 L

DGP/20-WP/93
19/12/05

DANGEROUS GOODS PANEL (DGP)

TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

AGENDA ITEM 3

The attached constitutes the report on Agenda Item 3 and should be inserted at the appropriate place in the yellow report folder.

(5 pages)

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 2007-2008 Edition

3.1 INVESTIGATION OF INCIDENTS OF UNDECLARED DANGEROUS GOODS IN CARGO (DGP/20-WP/26)

3.1.1 Paragraph 1.3 of this report proposes an amendment to Annex 18 which would require States to establish procedures for investigating and compiling information in respect of instances of undeclared or mis-declared dangerous goods in cargo. It was noted that, if adopted, this amendment will require the addition of corresponding provisions to the Supplement to the Technical Instructions. Since the proposed amendment to Annex 18 is unlikely to be applicable before the 2007/2008 edition of the Technical Instructions come into force, it was agreed to defer development of supporting material for the Supplement to a later date.

3.2 SELF-REACTIVE SUBSTANCES WITH EXPLOSIVE SUBSIDIARY RISK (DGP/20-WP/33)

3.2.1 A member reminded the meeting that at DGP/19, the panel agreed to regard self-reactive substances and organic peroxides with an explosive subsidiary risk as forbidden for carriage by air under any circumstances. Such goods had previously been so forbidden but alignment with the UN Model Regulations had inadvertently provided for the carriage of such dangerous goods under exemption. However, although Table 3-1 was amended accordingly, corresponding amendments were not made in the Supplement for the self-reactive entries.

3.2.2 It was suggested that the following four substances:

Self-reactive liquid type B UN3221
Self-reactive liquid type B, temperature controlled UN3231
5-tert-Butyl-2,4,6-trinitro-m-xylene UN2956
Musk xylene UN2956

also possessed an explosive subsidiary risk and like the substances discussed above are assigned Special Provision 215 in the Supplement. However, these appear to have been overlooked in the previous discussion and it is suggested they should also be forbidden under any circumstances.

3.2.3 There was some opposition to this proposal. A member expressed doubts as to whether some of the listed items (e.g. **Musk xylene**) truly fell into the category of self-reactive substances with explosive risk. They could not be carried without specific approval from authorities and it was suggested that this provided adequate protection for transport. Even if a previous decision had been made to make them forbidden under any circumstances, this decision could be revisited.

3.2.4 A further examination of the substances in question revealed that they do not always possess an explosive subsidiary risk. It was therefore proposed to leave the dangerous goods list unchanged and instead amend A215 to clarify the situation. Some members would have preferred to defer a decision on this matter, but the majority was in favour of the latest proposal to amend A215.

3.3 RECOMMENDATION

3.3.1 As a result of the forgoing discussion, 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*

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-3
DANGEROUS GOODS LIST
AND LIMITED QUANTITIES EXCEPTIONS

. . .

Chapter 3
SPECIAL PROVISIONS

. . .

Table S-3-4. Special Provision

. . .

A215 In certain circumstances, this substance may exhibit explosive behaviour ~~which may be suppressed~~and if so is forbidden for carriage by ~~the use of appropriate packagings. Packages containing this substance should bear the explosives subsidiary risk label unless the~~air under any circumstances. The appropriate national authority ~~is~~ must be satisfied on the basis of test results that the substance as packaged does not exhibit ~~this~~ explosive behaviour under normal conditions of transport. This, together with the appropriate packaging and the quantity limitation, must be certified by the appropriate authority of the State of Origin.

. . .

Part S-7
STATE'S RESPONSIBILITIES

. . .

Chapter 4
PROVISION OF INFORMATION

4.1 DANGEROUS GOODS ACCIDENTS AND INCIDENTS

4.1.1 The effectiveness and possible need for the modification of dangerous goods regulations and practices can only be measured if dangerous goods accidents and incidents, and discoveries of undeclared or misdeclared dangerous goods in cargo, are investigated, reported and analysed.

4.1.2 Each State must establish procedures for investigating and compiling information concerning dangerous goods accidents and incidents, and discoveries of undeclared or misdeclared dangerous goods in cargo, which occur on its territory and which involve the transport of dangerous goods originating in or destined for another State.

4.1.3 Each State should establish procedures for investigating and compiling information concerning dangerous goods accidents and incidents, and discoveries of undeclared or misdeclared dangerous goods in cargo, which occur on its territory, other than those described in 4.1.2.

. . .

4.6 UNDECLARED OR MISDECLARED DANGEROUS GOODS IN CARGO

The State in which undeclared or misdeclared dangerous goods are discovered in cargo, involving goods originating or destined for another State must carry out an investigation into the circumstances of the discovery such as is considered appropriate to its seriousness

~~4.6~~4.7 COMPLIANCE ASSURANCE

The competent authority should ensure compliance with the Technical Instructions. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, the classification of dangerous goods and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of the Technical Instructions are being met in practice.

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DGP/20-WP/93
19/12/05

DANGEROUS GOODS PANEL (DGP)

TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

AGENDA ITEM 4

The attached constitutes the report on Agenda Item 4 and should be inserted at the appropriate place in the yellow report folder.

(2 pages)

Agenda Item 4: Amendments to Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods (Doc 9481)

4.1 EMERGENCY RESPONSE DRILL CODE 11 (DGP/20-WP/67)

4.1.1 The meeting was reminded that Drill Code 11 had been added to the Emergency Response Guide concerning action to be taken in the event of a leakage of an infectious substance. It was noted that this drill called for "minimum recirculation and ventilation in the affected area". It was suggested that this was in conflict with other drills, which require maximum ventilation, and also the general consideration in paragraph 2.1 that:

> Air condition systems should be operated at maximum capacity and all cabin air vented overboard (no recirculation of air) in order to reduce the concentration of any contamination in the air and to avoid recirculation of contaminated air.

It was consequently proposed that Drill Code 11 should be amended to be more aligned with these general considerations.

4.1.2 Some members were hesitant to make any change without consulting health experts. One member had consulted with both health and airworthiness experts and as a result also did not support a change. It was pointed out that for an infectious substance, the objective was to avoid its spreading around the aircraft and, even with no recirculation, at maximum ventilation there would be considerable disturbance of the air inside the aircraft. In view of these points, it was agreed not to change the drill.

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DGP/20-WP/93
19/12/05

DANGEROUS GOODS PANEL (DGP)

TWENTIETH MEETING

Montréal, 24 October to 4 November 2005

AGENDA ITEM 5

The attached constitutes the report on Agenda Item 5 and should be inserted at the appropriate place in the yellow report folder.

(11 pages)

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

5.1 REFORMATTING OF THE PACKING INSTRUCTIONS

5.1.1 It was recalled that the task of reformatting the packing instructions had been pursued by the panel over the course of at least the past four years. The process had gone through a number of iterations during this period and at the DGP-WG/04 meeting, revised terms of reference for the task had been adopted and a small working group had been established to continue the work. Progress had been made but in the last few months a new approach to the problem had yielded very interesting results.

5.1.2 The meeting was given a presentation of the new approach which it reviewed with much interest. All those involved in the work were congratulated for their innovative thinking and hard work. The over-all objective of the reformatting was to enhance safety, to be achieved by minimizing the potential for errors when using the packing instructions and by applying a rationalized approach to the assignment of packaging requirements. This approach would remove inconsistencies, enhance user friendliness, develop a rational framework which could be used to assign packing instructions to new substances, simplify training, and simplify the system to assist shippers and operators which would ultimately enhance safety.

5.1.3 The proposed new system applies to Classes 3, 4, 5, 8 and Division 6.1. As yet it has not been applied to Classes 1, 2 and 9. The basis of the system has been the development of a series of generic packing instructions based upon class, division (where appropriate), type of aircraft and liquid or solid substance. For each combination of these parameters there would be a sub-division according to packing group and possibly according to the particular properties of the substance in question. Each packing instruction would be identified by a unique five-character code, describing class, division, type of aircraft (passenger or cargo), liquid or solid, and the packing instruction appropriate to the packing code and specific substance. For example, Packing Instruction 30PLB would be applicable to substances of Class 3 (no division), passenger aircraft, liquids and the letter “B” would indicate the specific packing instructions for the substance and packing group. It should be noted that in many cases the specific packing instruction is applicable to all substances in a particular packing group and in no case has it been necessary to have more than three groups of substances for each packing group. A perceived advantage of such a code is that it is immediately evident both to shippers and acceptance staff that the packing instruction applies to a particular type of aircraft and to either a liquid or a solid.

5.1.4 For each packing group as defined above, the permissible inner packagings and associated quantity limits would be indicated as well as the outer packaging quantity limits. For each over-all class or division/aircraft type/liquid or solid combination, the additional packing requirements, outer containers for combination packagings and single packagings where applicable are shown. There would also be a set of requirements for specific substances which did not fit into this general scheme, but these were relatively few in number. An example of the probable new format of the packing instructions and of their use in the dangerous goods list is shown in the appendix for information.

5.1.5 The meeting discussed at length how it should proceed with the development of the system, it being noted that a few refinements were still required. It was agreed that before it was finalized it should be widely disseminated to obtain the comments of authorities and potential users. Only when

input from all stakeholders had been received would it be possible to finalize the system. In this context, it was stressed that it did constitute a system and changes which deviated from the over-all system would run the risk of destroying its over-all benefit which was its comprehensive and consistent nature. It was agreed that the primary means of disseminating the information would be to publish the draft on an appropriate ICAO public website, with an invitation to make comments to the Secretary of the DGP. It was also agreed that the existence of the draft and the request for comments should be mentioned in the next edition of the Technical Instructions. Members agreed to publicize the draft, as did IATA and it was also agreed to draw it to UNSCETDG's attention. The deadline for responses would be such as to ensure that they could be collated and presented to the anticipated DGP-WG/07 meeting, probably to be held in April 2007.

5.1.6 There was further discussion on the need for a transition period when the new system was eventually included in the Technical Instructions. Several members mentioned the undesirability of having new and old systems in place side by side for a transition period. Other members mentioned difficulties that might arise because they normally incorporated the Technical Instructions directly into their own regulatory codes, but could not necessarily do this on the same date as the Technical Instructions became applicable. There was also the problem that goods in transit might become illegal en-route. The general opinion was that the subject of phase-in did not need to be addressed at present and was perhaps a subject on which potential users' views should be sought.

5.2 PROVISIONS CONCERNING PASSENGERS AND CREW (DGP/20-WP/60)

5.2.1 The meeting held extensive discussions on this subject. It agreed that the objectives of its study should be to:

a) identify criteria to be used to determine if a dangerous substance or article was suitable for inclusion in Part 8;

b) develop proposals to enhance the user-friendliness of the Part 8 provisions;

c) standardize interpretations of the provisions of Part 8 by ICAO Member States; and

d) review the current provisions in Part 8 against the established criteria.

Subsequent discussions on each of these objectives were as follows:

5.2.2 Criteria for inclusion in Part 8

5.2.2.1 It was agreed that in deciding whether an article or substance could be added to Part 8, the following questions would need to be addressed:

a) has a risk assessment (e.g. Failure Modes and Effects Analysis (FMEA)) been conducted? What is the likelihood of an incident? What measures have been taken to prevent an incident (e.g. are two effective means of preventing inadvertent initiation installed)?

b) what emergency response capabilities are required (e.g. equipment and personnel) for the proposed location of the dangerous goods on board the aircraft (e.g. checked baggage or carry-on baggage, on the person)? *Emergency Response will need to consider the hazard characteristics of the dangerous goods and the characteristics of the various types of aircraft. Are the emergency response measures appropriate to mitigate the hazards (e.g. extinguish a fire) in the event of an incident? Has the fact that carry-on baggage is not always restricted to the cabin been taken into account?*

c) has the maximum allowable quantity per passenger of dangerous goods for the intended use been identified?

d) have the appropriate marking, packaging and handling instructions to ensure safe transport been identified (e.g. release valves on aerosols must be protected by a cap or other suitable means to prevent release; batteries must be protected from short circuit)?

e) is compliance practical and measurable by everyone in the transport chain, e.g. passengers, passenger screening agents, and operators' personnel?

f) has consideration been given to the availability of the dangerous goods at destination?

g) has consideration been given to the availability of alternate non-dangerous goods technologies, e.g. pump aerosols?

h) if an item is prohibited will passengers carry them anyway?

i) do international security provisions affect the transport of the substance or article?

j) does the operator need to give prior approval? (i.e. The operator may need to know what dangerous goods are involved in order to comply with national legislation, operator variations or to make advance arrangements for their transport e.g. stowage of battery operated wheelchairs)

k) does the pilot need to know that the dangerous goods are on board?

l) why does the crew member or passenger need the item? For instance is the item essential for medical use? ('Essential' means dangerous goods required to sustain the health and/or mobility of a passenger or crewmember. 'Essential' includes pharmaceutical prescriptions, oxygen cylinders, inhalers, mosquito repellants, etc.

A further criterion to be added was the question of whether the dangerous goods involved were permitted as cargo on a passenger aircraft.

5.2.2.2 It was agreed that once these questions had been answered for a candidate article, the answer should be made available to DGP members and industry groups involved. It was noted that this list of questions should be continually updated on the basis of further study and experience.

5.2.2.3 It was further agreed that a statement should be developed for addition to Part 8 which would clarify that items not subject to the Technical Instructions may be carried by passengers and crew.

5.2.3 **Enhancing the user-friendliness of Part 8**

5.2.3.1 It was agreed that the provisions of Part 8 needed to be easy to comply with and enforceable. To this end, in future work existing examples of a more user-friendly format would be examined. The meeting examined a list of typical articles which were or could be covered by Part 8, as well as some categorized lists developed in a State.

5.2.4 **Interpretation of the present Part 8 by States**

5.2.4.1 It was agreed to explore whether State interpretations of the current Part 8 could be collected for comparative purposes and posted on the secure DGP website. It was also agreed that the ICAO public website could be used to share information about new technologies as they related to carriage by aircraft passengers and crew.

5.2.5 **Review of the existing Part 8 in relation to the new criteria**

5.2.5.1 It was agreed that this should be done as part of future work.

5.2.6 The meeting agreed that there remained much work to be done on this topic and that it should continue to be pursued during the next triennium.

5.3 REVIEW OF THE PRINCIPLES INVOLVED IN PROVISIONS FOR THE TRANSPORT OF DANGEROUS GOODS ON CARGO AIRCRAFT ONLY (DGP/20-WP/78)

5.3.1 The meeting held extensive discussions on this topic. It was noted that the current accessibility requirements of the Technical Instructions:

a) effectively limited the total quantity of cargo aircraft only (CAO) dangerous goods that could be transported on a given aircraft;

b) avoided a concentration of CAO dangerous goods in one part of the aircraft because of the need for the packages to be “seen” by the crew;

c) gave the flight crew and loading personnel an additional opportunity to inspect the load; and

d) provided a “last resort” opportunity for the flight crew to deal with a fire.

In respect of d), however, it was noted that for some two-pilot aircraft the manufacturer’s operating manual made no provision for a crew member to leave the flight deck in an emergency. Nevertheless, such actions would always be at the discretion of the pilot-in-command for safety reasons.

5.3.2 Two specific questions raised in relation to this topic were:

a) should the current accessibility provisions of the Technical Instructions apply to all aircraft, including those below 5,700 kg? Aircraft of this category may have unrated cargo compartments, i.e. not Class A, B, etc.; and

b) should restrictions apply to single pilot aircraft?;

Some concern was expressed at the use of single pilot aircraft for the transport of CAO dangerous goods. However, for some remote operations, small, single pilot aircraft may be the only ones used and to prohibit the carriage of CAO would impose significant hardship on communities served by this type of operation.

5.3.3 A question was raised whether Class C cargo compartments, which have fire detection and suppression systems, may be suitable for the carriage of CAO dangerous goods. It was agreed that Class C compartments offer some additional protection with respect to fires; however, it was believed that more work may be required to evaluate how effective the fire suppression systems were in dealing with the larger quantities contained in packages of CAO dangerous goods. Against the use of Class C compartments is that, being underfloor compartments, on narrow-body aircraft the majority of them will not be capable of handling containers and the packages will have to be manually loaded, would make the packages more susceptible to damage.

5.3.4 Another topic was the use of the CAO label simply because of the quantity per package. An operator could have many packages containing passenger quantities of dangerous goods and these did not need to be accessible, but one package of the same dangerous goods in a larger quantity would become CAO and have to be accessible. It was therefore suggested that the criterion for determining accessibility should perhaps be that a substance was forbidden for carriage on a passenger aircraft and not the quantity in the package. While this may have appeared to be attractive, the meeting was cautioned that it would represent a complete change of philosophy and would require extensive amendments to the Technical Instructions.

5.3.5 It was suggested that it might be appropriate to consider which classes/divisions of CAO dangerous goods could be added to the list of CAO dangerous goods that are not required to be accessible. One example that could be considered was Division 2.3. Presently CAO packages of Division 6.1 are not required to be accessible, but CAO packages of Division 2.3 are required to be accessible and this would appear to be inconsistent. An additional issue with respect to accessibility was that the Technical Instructions require that the goods be accessible to the crew during flight. However, there is no consideration given to what equipment the crew should have available for this purpose. For example, do existing smoke hoods provide sufficient oxygen for a crewmember to be able to reach the rear of the main deck on a B747, deal with a fire and safely return to the flight deck before the oxygen supply in the smoke hood is exhausted. It was noted that one aircraft manufacturer of a two-pilot aircraft type had provided advice that the non-normal checklists require that both pilots remain on the flight deck to follow the documented procedures and checklists; nevertheless, the pilot-in-command may always take action as he or she sees fit for safety reasons. This appears to conflict with the expectation that one pilot will leave the flight deck to deal with a problem.

5.3.6 The meeting agreed that a considerable amount of further work on this topic would be needed during the next biennium. It was agreed that the following aspects should be pursued:

a) a review of the existing list of dangerous goods that must be accessible;

b) the meaning of “see, handle and where weight and size permit separate”;

c) the merits of Class C cargo compartments;

d) the need to coordinate with other ICAO groups;

e) the safety of large packagings compared with small ones;

f) the potential benefits of closed ULDs;

g) single pilot / small aircraft concerns;

h) the criterion of quantity versus the forbidden on a passenger aircraft aspect;

i) examples of where accessibility has mitigated an incident.

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APPENDIX

EXAMPLE OF PROBABLE NEW FORMAT OF THE PACKING INSTRUCTIONS AND THEIR USE IN THE DANGEROUS GOODS LIST

CLASS 3 PASSENGER AIRCRAFT
30PL

Packing Group	Inner Packaging	Inner Packaging Quantity	Packing Instruction	Outer Quantity
I	GLASS (IP.1)	**0.5 L**	A	**0.5 L**
	PLASTIC (IP 2)	**FORBIDDEN**		
	METAL (IP 3/3A)	**0.5 L**		
I	GLASS (IP.1)	**0.5 L**	B	**1.0 L**
	PLASTIC (IP 2)	**FORBIDDEN**		
	METAL (IP 3/3A)	**1.0 L**		
II	GLASS (IP.1)	**1.0 L**	C	**1.0 L**
	PLASTIC (IP 2)	**1.0 L**		
	METAL (IP 3/3A)	**1.0 L**		
II	GLASS (IP.1)	**1.0 L**	D	**5.0 L**
	PLASTIC (IP 2)	**5.0 L**		
	METAL (IP 3/3A)	**5.0 L**		
III	GLASS (IP.1)	**2.5 L**	E	**5.0 L**
	PLASTIC (IP 2)	**5.0 L**		
	METAL (IP 3/3A)	**5.0 L**		
III	GLASS (IP.1)	**2.5 L**	F	**60.0 L**
	PLASTIC (IP 2)	**10.0 L**		
	METAL (IP 3/3A)	**10.0 L**		

ADDITIONAL PACKAGING REQUIREMENTS

- THE GENERAL PACKING REQUIREMENTS OF PART 4, CHAPTER 1 MUST BE MET.
- SUBSTANCES MUST BE COMPATABLE WITH THEIR PACKAGINGS AS REQUIRED BY 4; 1.1.3.

PG I

- SINGLE PACKAGINGS ARE NOT PERMITTED.
- PLASTIC INNER PACKAGINGS NOT PERMITTED.
- GLASS OR EARTHENWARE INNER PACKAGINGS MUST BE PACKED WITH ABSORBENT MATERIAL AND PLACED IN A LEAKPROOF RECEPTACLE BEFORE PLACING IN OUTER PACKAGINGS.
- PLASTIC AND METAL INNER PACKAGINGS MUST BE PLACED IN A LEAKPROOF LINER, PLASTIC BAG OR OTHER EQUALLY EFFICIENT MEANS OF INTERMEDIATE LEAKPROOF CONTAINMENT.
- METAL PACKAGINGS MUST BE CORROSION-RESISTANT OR WITH PROTECTION AGAINST CORROSION FOR SUBSTANCES WITH A CLASS 8 SUBRISK.

PG II

- SINGLE PACKAGINGS ARE NOT PERMITTED.
- GLASS OR EARTHENWARE INNER PACKAGINGS MUST BE PACKED WITH ABSORBENT MATERIAL AND PLACED IN A LEAKPROOF RECEPTACLE BEFORE PLACING IN OUTER PACKAGINGS.
- PLASTIC AND METAL INNER PACKAGINGS MUST BE PLACED IN A LEAKPROOF LINER, PLASTIC BAG OR OTHER EQUALLY EFFICIENT MEANS OF INTERMEDIATE LEAKPROOF CONTAINMENT.
- METAL PACKAGINGS MUST BE CORROSION-RESISTANT OR WITH PROTECTION AGAINST CORROSION FOR SUBSTANCES WITH A CLASS 8 SUBRISK.

PG III

- SINGLE PACKAGINGS ARE PERMITTED.
- FOR COMBINATION PACKAGES, ALL INNER PACKAGINGS MUST BE PLACED IN A PLASTIC BAG OR OTHER EQUALLY EFFICIENT MEANS OF PROTECTION.
- PACKAGINGS MUST MEET THE LEVEL II PERFORMANCE STANDARDS.

OUTER CONTAINERS FOR COMBINATION PACKAGINGS

BOXES	DRUMS	JERRICANS
ALUMINUM (4B)	ALUMINUM (1B2)	ALUMINUM (3B2)
FIBREBOARD (4G)	FIBRE (1G)	PLASTIC (3H2)
PLYWOOD (4D)	PLASTIC (1H2)	STEEL (3A2)
RECONSTITUTED WOOD (4F)	PLYWOOD (1D)	
SOLID PLASTIC (4H2)	STEEL (1A2)	
STEEL (4A)		
WOODEN (4C1, 4C2)		

SINGLE PACKAGINGS FOR PG III

COMPOSITES (PLASTIC)	CYLINDERS	DRUMS	JERRICANS
ALL	SEE ??	ALUMINUM (1B1)	PLASTIC (3H1)
		PLASTIC (1H1)	STEEL (3A1)
		STEEL (1A1)	

Name	UN No.	Class or division	Subsidiary risk	Labels	State variations	Special provisions	UN packing group	Limited quantities	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					
n-Amylene	1108	3					I	Forbidden	30PLB	1 L	30CLB	30 L
n-Butylamine	1125	3	8				II	30LLQA	30PLC	1 L	30CLD	5 L
1-Bromobutane	1126	3					II	30LLQB	30PLD	5 L	30CLE	60 L
Potassium chlorate, aqueous solution	2427	5.1					II	51LLQA	51PLA	1 L	51CLB	5 L
Oxidizing solid, n.o.s.*	1479	5.1					I	Forbidden	51PSA	1 kg	51CSA	15 kg
Water-reactive solid, corrosive, n.o.s.*	3131	4.3	8				II	43LQSA	43PSA	15 kg	43CSC	50 kg

— END —