



DANGEROUS GOODS PANEL (DGP)

TWENTY-SIXTH MEETING

Montréal, 16 to 27 October 2017

Agenda Item 7: Other business

REPORT OF THE DANGEROUS GOODS PANEL (DGP) WORKING GROUP MEETING (DGP-WG/17)

Montréal, 24 to 28 April 2017

1. INTRODUCTION

1.1 The meeting of the Dangerous Goods Panel Working Group Meeting (DGP-WG/17) was convened from 24 to 28 April 2017. Ms. M. Paquette was elected Chairperson of the meeting and Mr. B. Firkins was elected Vice-Chairperson.

2. ATTENDANCE

2.1 The meeting was attended by the following panel members, advisers and observers:

Members	Advisers/Observers	State/International Organization
B. Firkins		Australia
	M. Böhm	Austria
	F. Carroll	Bahamas
L. Cascardo		Brazil
M. Paquette	D. Evans E. Werszko	Canada
	D. Cheng Z. Qiu C. Chan (Hong Kong SAR)	China
	J. Wiren Bengtsson	Denmark
P. Tatin	M. Cosset	France
H. Brockhaus		Germany
P. Privitera	C. Carboni A. Pellas	Italy

Members	Advisers/Observers	State/International Organization
H. Sugimoto	M. Araya A. Awano Y. Funai K. Maeda A. Uchizawa	Japan
T. Muller	E. Boon R. Dardenne K. Vermeersch	the Netherlands
S.W. Park	J. Godfrey B. Oh P. Rhee S. Yoo	Republic of Korea
D. Mirko	D. Kurdchenko	Russian Federation
	M.Á. de Castro	Spain
	R. Cataldo N. Hagmann	Switzerland
	O. Dogrukol S. Gunes Y. Yillikci G. Yuksel	Turkey
H. Al Muhairi	A.W. Wagih K. A. Al Belooshi M. Ebrahim Al Ali	United Arab Emirates
E. Gillett	D. Warden	United Kingdom
A. Stubblefield	A. Alverno M. Givens K. Leary J. McLaughlin D. Pfund	United States
D. Brennan	P. Horner P. Oppenheimer	International Air Transport Association (IATA)
P. Rohrbach	D. Ferguson	International Coordinating Council of Aerospace Industries Associations (ICCAIA)
S. Schwartz		International Federation of Air Line Pilots' Associations (IFALPA)
	K. Rooney L. McGuigan	International Civil Aviation Organization (ICAO)
	B. Carrara H. Guedes	Regional Safety Oversight Cooperation System (SRVSOP)
	T. Brinkley	Universal Postal Union (UPU)

Members	Advisers/Observers	State/International Organization
	K. Kojima	World Health Organization (WHO)
	E. Sigrist	European Chemical Industry Council (CEFIC)
	A. Altemos G. Leach N. McCulloch	Dangerous Goods Advisory Council (DGAC)
	B. McClelland A. McCulloch	Global Express Association (GEA)
	S. Rossetti	Medical Device Battery Transport Council (MDBTC)
	C. Chanson	Society of Automotive Engineers (SAE)
	B. Desnoyers A. Presta	World Nuclear Transport Institute (WNTI)

3. REVIEW OF THE REPORT

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

3.1.1.1 See paragraph 3.5.4.

3.2 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 2019-2020 Edition

3.2.1 Agenda Item 2.1: Part 1 — General

3.2.1.1 Avalanche Control Activity (DGP-WG/17-WP/9)

3.2.1.1.1 The 2016 Meeting of the DGP Working Group (DGP-WG/16, Montréal, 17 to 21 October 2016) considered an amendment to the provisions excepting dangerous goods used in connection with avalanche control in Part 1;1.1.5.1 to allow for a new remotely-operated avalanche control system that had been developed for carriage by helicopter. There had been support in principle for the original proposal, but concerns were raised with respect to the prescriptive nature of the exceptions which focused on end use and resulted in the need for frequent amendments. However, while a more performance-based approach reduced the need for updates if new technology emerged in the future, it also introduced the risk of widening the scope of the exceptions.

3.2.1.1.2 A revised proposal which separated dropping or triggering in connection with avalanche control activities into its own exception was agreed by DGP-WG/17.

3.2.1.2 Approvals and Exemptions for the Transport of Radioactive Material (DGP-WG/17-WP/10)

3.2.1.2.1 Potential complications were discussed at DGP-WG/16 in cases where shippers required exemptions to ship consignments of radioactive material which could not be packaged in full compliance with the Technical Instructions and also required approvals from the competent authority because of higher radioactive material activity levels. Several documents would be needed for such a consignment, which had caused confusion for operators and added a degree of complexity in communication between operators and shippers. A note indicating that radioactive material transported under an exemption did not provide any relief from the need to obtain special arrangement approval was therefore proposed.

3.2.1.2.2 There was agreement that such a scenario would result in the need for multiple authorizations from both the competent authority and the civil aviation authority. This did not seem reasonable when the conditions were the same, and it was unclear which agency would take precedence. It was suggested that this was an issue that should be raised with the International Atomic Energy Agency (IAEA). The Secretariat would coordinate with the presenter and raise the issue at the next IAEA Transport Safety Standards Committee (TRANSSC) meeting.

3.2.1.3 Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 1 (DGP-WG/17-WP/11)

3.2.1.3.1 Draft amendments to Part 1 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16 (Montréal, 17 to 21 October 2017). A dedicated working group was tasked with reviewing the amendments. No changes were made. It was agreed that DGP-WG/17-WP/11 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.1.4 Dangerous Goods Transported as Replacement by the Operator (DGP-WG/17-WP/32)

3.2.1.4.1 The working group was asked to consider removing “unless otherwise authorized by the State of the Operator” which preceded each of the provisions requiring articles or substances intended as replacements for those subject to the exceptions for dangerous goods of the operator to be transported in accordance with the Instructions (Part 1; 2.2.2, 2.2.3 and 2.2.4). It was argued that the lack of any reference to an approval or an exemption meant that other States involved in the transport of such goods would not have a say in how the operator shipped the replacements and there was no requirement for an equivalent level of safety. It was suggested that this provided too much flexibility and could lead to a lack of international harmonization and the introduction of risks should the State of the Operator decide to allow the exceptions when the dangerous goods were being transported as replacements.

3.2.1.4.2 While there was recognition that removing the provision for the State of the Operator to grant authorization would create greater harmonization among States, the change would result in the need for exemptions which would be onerous. It was suggested that some operators abused this provision and that the number of requests for mundane articles had increased. But most considered the risks from such articles could be handled by the operator and did not consider there was a safety issue that needed to be addressed. There was some discussion on development of guidance material as an approach to establishing a degree of consistency as to how and when States granted authorizations, but most did not believe this was necessary.

3.2.1.4.3 The amendment was not agreed.

3.2.1.5 Provisions for Dangerous Goods in Post (DGP-WG/17-WP/42)

3.2.1.5.1 It was noted that some States were requiring mail to be reported to customs by means of an air waybill, and there was an expectation that all mail would be moved by use of an air waybill in time. It was noted, however, that specific requirements in the Technical Instructions for information to be provided on a transport document or an air waybill for some of the dangerous goods permitted by mail were not required by the Acts of the Universal Postal Union. Modifications to the provisions for dangerous goods in the post with respect to dry ice and radioactive material in excepted packages were therefore proposed for the sake of alignment.

3.2.1.5.2 A number of questions and issues were raised during the discussion of the proposal that could not be addressed at the meeting, including:

- a) whether an acceptance check would still be required, noting that removing the requirements for information to be provided on a document would make it impossible for operators to provide the necessary information to the pilot-in-command;
- b) providing relief from the provisions for dangerous goods in the mail that was not provided to cargo was considered unjustified;
- c) conflicting regulations within the UPU with respect to dry ice were identified by a representative of the Universal Postal Union (UPU) whereby dry ice was prohibited in the mail in some UPU documents but not in others;
- d) whether documentation required in accordance with Packing Instruction 954 (dry ice) and Part 5;1.2.4.2 (excepted packages of radioactive material) applied to mail; and
- e) whether operators were expected to perform acceptance checks and provide information to the pilot-in-command for dry ice and excepted packages of radioactive material in the mail; and

3.2.1.5.3 The Secretariat provided the working group with terms of reference for the newly-established ICAO-UPU Contact Committee. DGP-WG/16 had been informed of the committee and panel members and observers had been invited to nominate members to it. Three had been nominated after DGP-WG/16. The intent of the contact committee was to provide a forum for the discussion of matters relating to the safety, security and facilitation of air mail. The committee's first face-to-face meeting was expected to take place during Summer 2017. It was suggested that the issues raised during the discussion of the working paper which impacted the UPU could be raised at that time, noting that acceptance checks and information-to-pilot in command requirements were specific to ICAO. The proposer would submit another working paper to DGP/26 based on feedback received.

3.2.1.6 Report of the Working Group on Training (DGP-WG/17-IP/3)

3.2.1.6.1 An update on the DGP Working Group on Training's review of comments received from States and industry on the proposed new training provisions that were included as advance information in Attachment 4 to the 2017-2018 Edition of the Technical Instructions was provided.

3.2.1.6.2 The DGP Working Group on Training met in Ottawa on 18 and 19 April 2017. The purpose of the meeting was to review feedback from States, international organizations and industry

which had been provided in response to State letter AN11/2.1-16/91 and to the survey that had been provided on the ICAO public website. The State letter and the survey sought comments on the draft training provisions and guidance material that were included as advance information in Attachment 4 to the 2017-2018 Edition of the Technical Instructions. The State letter also sought comments on the new guidance on competency-based training for State employees involved in the regulation and oversight of dangerous goods contained in the 2017-2018 Edition of the Supplement to the Technical Instructions.

3.2.1.6.3 Thirty States responded to the State letter and one hundred and thirteen responses were received from States and industry to the web-based survey. Of the latter, fifty-one were trainers or training providers, eighteen were regulators, twenty were operators, eight were shippers, five were freight forwarders, three were dangerous goods safety advisors or consultants, one was a pilot representative, one was a ground handling agent, and six were from other industry organizations.

3.2.1.6.4 The majority of responses indicated a strongly favourable or favourable impression of the new training provisions, but concerns were raised with how competency-based training could be implemented, particularly for small organizations, and the cost to do so. It was evident that many believed that the competency-based training approach would become mandatory, but this was not the intent. The new competency-based training material was simply meant as guidance for one method of achieving the training objectives. It was an approach which didn't preclude other approaches as long as they achieved the same goal. It was evident that this concept would need to be clarified.

3.2.1.6.5 Comments related to the removal of Tables 1-4 and 1-5 were the most substantive. These were repeated by members and observers at DGP-WG/17. Those who supported eliminating the tables believed that retaining them went against competency-based training principles and eliminating them would result in more focused and effective training. Those who opposed eliminating the tables believed this would lead to a lack of standardization internationally and variability among States. While never intended as mandatory, they had become the standard internationally by States and industry and had become the basis for developing training programmes. The categories of personnel listed on the table were referred to on training records. They provided minimum criteria for knowledge of subject matter on which employers could evaluate employees moving from one organization or one job to another. While the concept of a needs analysis and development of focused training was a good one, some believed the huge investment in planning and analysis needed was something some employers were not in a position to do.

3.2.1.6.6 Comments related to the need for more guidance material on the assessment and on the responsibilities of regulators, employers and instructors were also substantive.

3.2.1.6.7 The DGP Working Group on Training would continue to work through correspondence and at a face-to-face meeting during the week of 17 July 2017 to complete its review and to address comments received.

3.2.1.6.8 DGP-WG/17 was also advised of amendments to the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) that would result in the need for consequential changes to the new dangerous goods training provisions. Work on adapting the provisions would also be undertaken through correspondence and at a face-to-face meeting scheduled for the week of 17 July 2017.

3.2.2 **Agenda Item 2.2: Part 2 — Classification**

3.2.2.1 **Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 2 (DGP-WG/17-WP/12)**

3.2.2.1.1 Draft amendments to Part 2 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. A dedicated working group was tasked with reviewing the amendments. The dedicated working group identified the following issues:

3.2.2.1.2 Concerns were raised with respect to the addition of new provisions added to the UN Model Regulations for classification of articles containing dangerous goods not otherwise specified (n.o.s.). Twelve new entries were added to the dangerous goods list for articles containing dangerous goods n.o.s. of Classes 2, 3, 4, 5, 8, 9 and Division 6.1. A cross reference to the new provisions in Part 2 was included in the subsidiary hazard column of the dangerous goods list in place of an actual hazard class or division. The provisions also included a new note referencing UN 3363 for articles containing dangerous goods in limited quantities within the limits specified in the dangerous goods list. The chairman of the UN Sub-Committee of Experts on the Transport of Dangerous Goods was present and noted the addition of the n.o.s. entries was intended to provide a systematic approach for dealing with new articles so as to prevent the need for separate entries for each new article entering the market.

3.2.2.1.3 The working group had several concerns with respect to the new provisions and considered whether there was justification for allowing them for transport by air. An ad hoc working group was established to consider how the new provisions should be addressed. The ad hoc group recommended:

- a) forbidding the n.o.s. articles from transport by air under normal circumstances unless approval was granted by the State of Origin and the State of the Operator in accordance with Special Provision A2;
- b) adding the classification provisions to Part 2;0.5 with some amendments to reflect requirements of the Technical Instructions;
- c) adding a new special provision for UN 3363 — **Dangerous goods in apparatus** or **Dangerous goods in machinery** to address the gap between the quantity of dangerous goods permitted in apparatus or machinery in accordance with UN 3363 of the UN Model Regulations and the quantity permitted in accordance with Packing Instruction 962 of the Technical instructions;
- d) developing a new packing instruction for the Supplement that would be assigned to each of the new entries for articles n.o.s. and numbered “006” to align with the packing instruction number in the UN Model Regulations;
- e) determining what drill codes should be assigned in Tables 4-2 and 4-3 of Doc 9481, *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods*; and
- f) clarification of the labelling requirements for an article n.o.s. that may also contain lithium batteries.

The ad hoc working group would develop amendments to address these recommendations for incorporation in the DGP/26 working paper on UN harmonization.

3.2.2.1.4 It was agreed that DGP-WG/17-WP/12 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.3 **Agenda Item 2.3: Part 3 — Dangerous Goods List, Special Provisions and Limited and Excepted Quantities**

3.2.3.1 **Assignment of Special Provision A67 Against Entries for Engines, Machinery and Vehicles (DGP-WG/17-WP/2)**

3.2.3.1.1 Special Provision A67 provided an exception from full regulation under certain conditions for non-spillable batteries. While the equivalent special provision in the UN Model Regulations (SP 238) was assigned only to UN 2800, Special Provision A67 was assigned to the following entries in the Technical Instructions:

- UN 2800 — Non-spillable wet batteries (Class 8)
- UN 3171 — Battery-powered vehicles (Class 9)
- UN 3171 — Battery-powered equipment (Class 9)
- UN 3166 — Vehicles powered by flammable liquids or flammable gases (Class 9)
- UN 3166 — Vehicles powered by flammable liquid or flammable gas fuel cells (Class 9)
- UN 3529 — Flammable gas powered internal combustion engines and machinery (Division 2.1)
- UN 3529 — Machinery and engines powered by flammable gas fuel cells (Division 2.1)
- UN 3528 — Flammable liquid powered internal combustion engines and machinery (Class 3)
- UN 3528 — Machinery and engines powered by flammable liquid fuel cells (Class 3)

3.2.3.1.2 The working group was invited to consider whether it was necessary to assign Special Provision A67 to all of the entries for engines, machinery and vehicles. Accordingly, a proposal to maintain A67 against the entries for non-spillable wet batteries (UN 2800) and battery-powered equipment (UN 3171) while removing the assignment of it from the remaining entries was proposed. While the potential for non-spillable batteries contained in engines, machinery or vehicles to be considered “not regulated” by removing the assignment of this special provision was recognized, it was argued that other dangerous goods would be contained within the engines, machinery or vehicles making this possibility irrelevant.

3.2.3.1.3 The working group was also invited to:

- a) consider whether a proposal to the UN Sub-Committee to assign the corresponding UN special provision to UN 3171 — **Battery powered equipment** should be made; and
- b) consider whether Special Provision A176 should be assigned to UN 3529 (engines and machines powered by flammable gas fuel cells), suggesting that this special

provision, which specified requirements for metal hydride storage systems, should be assigned to all machines, engines and vehicles powered by fuel cells.

3.2.3.1.4 It was suggested during the discussion that Special Provision A67 should remain for UN 3171 — **Battery powered vehicle** despite the fact that the corresponding UN special provision was not assigned to the entry in the Model Regulations. This was agreed.

3.2.3.1.5 There was no opposition to assigning Special Provision A176 to UN 3529, but a number of comments related to this special provision were raised. Special Provision A176 was already assigned to engines and machinery powered by flammable liquid fuel cells (UN 3528) and vehicles powered by flammable liquid fuel cells (UN 3166) in the Technical Instructions, and it was suggested that this was not necessary. It was noted that the corresponding UN special provision (SP356) was not assigned to UN 3528 or UN 3529 in the Model Regulations, although it was assigned to all proper shipping names for UN 3166. The proposer advised that he would submit a paper to the UN Sub-Committee seeking clarification.

3.2.3.1.6 The amendments related to Special Provision A67 were agreed, subject to its retention for UN 3171 — **Battery –powered vehicle**. The assignment of Special Provision A176 to UN 3529 would be placed in square brackets pending feedback from the UN Sub-Committee.

3.2.3.1.7 Although unrelated to the proposal, it was noted that the Class 9 label for lithium batteries might apply for UN 3171 — **Battery-powered equipment** or **Battery-powered vehicle**, when the equipment or vehicle was powered by a lithium battery, yet this was not addressed in the Technical Instructions. This would need to be given consideration.

3.2.3.2 **Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 3 (DGP-WG/17-WP/13)**

3.2.3.2.1 Draft amendments to Part 3 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. A dedicated working group was tasked with reviewing the amendments. The dedicated working group identified the following issues:

- a) The UN Sub-Committee added UN 3536 — **Lithium batteries installed in cargo transport unit** to the dangerous goods list. These cargo transport units were very large and could have significant quantities of powerful batteries installed. While it was not believed that there would be any need to transport these by air on a regular basis, there might be a need to transport them on an exceptional basis. It was therefore recommended that these be forbidden for transport by air under normal circumstances but that a special provision be developed so as to allow their transport under certain conditions with the approval of the State of Origin and State of the Operator. Panel members volunteered to work with appropriate experts to develop the provision.
- b) Twelve new entries were added to the dangerous goods list for articles containing dangerous goods of Classes 2, 3, 4, 5, 8, 9 and Division 6.1. The dedicated working group recommended that these be forbidden for transport by air under normal circumstances unless approval was granted by the State of Origin and the State of the Operator in accordance with Special Provision A2 (see paragraphs 3.2.2.1.2 and 3.2.2.1.3).

- c) Revisions to Special Provision A44 were made to align with SP 251 of the Model Regulations. The revisions included references to the excepted quantity codes in Table 3-3. The UN referred to “maximum *net* quantity per inner packaging” in both SP 251 and the table of excepted quantity codes in the Model Regulations. The Technical Instructions referred to “maximum quantity per inner packaging” in Table 3-3. It was agreed to maintain “maximum quantity per inner packaging” in Table 3-3 and in Special Provision A44.
- d) Revisions to Special Provision A125 were made to align with SP 293 of the Model Regulations. Editorial changes to the revision were made for the sake of clarity.
- e) Revisions to Special Provision A194 were made to align with SP 369 of the Model Regulations. Reference to “*radioactive material* and corrosive subsidiary risks” in SP 369 was revised to read “*radioactivity* and corrosive subsidiary risks” and it was questioned whether this was appropriate. The Sub-Committee would be asked for clarification.
- f) Editorial amendments were made to Special Provision A214 for the sake of clarity and consistency with other provisions.
- g) A new special provision added to the UN Model Regulations (SP 392) for the transport of fuel gas containment systems was not included in the Technical Instructions.
- h) a new special provision for UN 3363 — **Dangerous goods in apparatus** or **Dangerous goods in machinery** would be developed to address an anomaly introduced with the UN provision to allow articles containing only dangerous goods within the limited quantity limits for UN 3363 (see paragraphs 3.2.2.1.2 and 3.2.2.1.3);

3.2.3.2.2 It was agreed that DGP-WG/17-WP/13 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.4 Agenda Item 2.4: Part 4 — Packing Instructions

3.2.4.1 Packing Instruction 952 (DGP-WG/17-WP/5)

3.2.4.1.1 Amendments to Packing Instruction 952, which applied to UN 3171 — **Battery-powered equipment** and **Battery-powered vehicle**, were proposed to address potential omissions. These were:

- a) a requirement for the batteries to be protected from inadvertent activation; and
- b) a requirement for lithium ion batteries for e-bikes to be consigned as UN 3481 — **Lithium ion batteries packed with equipment**, when the battery was removed from the e-bike and packed with the bike but in separate packaging.

3.2.4.1.2 The addition of a requirement for the batteries to be protected from inadvertent activation was not agreed as the requirement was already contained in Special Provision A164.

3.2.4.1.3 The addition of a requirement for batteries to be consigned as UN 3481 was agreed in principle, but it was suggested that this requirement should also apply to lithium metal batteries. Revised text was proposed and agreed.

3.2.4.1.4 It was also identified that text related to the battery being secured in the vehicle was repeated in two places in the packing instruction. It was agreed to delete the redundant text.

3.2.4.2 Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 4 (DGP-WG/17-WP/14)

3.2.4.2.1 Draft amendments to Part 4 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. A dedicated working group was tasked with reviewing the amendments.

3.2.4.2.2 A new packing instruction was added to the UN Model Regulations for the new entries in the dangerous goods list for articles containing dangerous goods n.o.s. (see paragraphs 3.2.2.1.2 and 3.2.2.1.3). The dedicated working group recommended that these articles be forbidden for transport on aircraft under normal circumstances but permitted under an approval issued by the State of Origin and the Operator in accordance with Special Provision A2. A new packing instruction for incorporation in the Supplement would be developed and given the same number as the corresponding packing instruction in the UN Model Regulations (numbered Packing Instruction 006).

3.2.4.2.3 It was agreed that DGP-WG/17-WP/14 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.4.3 Packing Instruction Y963 (DGP-WG/17-WP/21)

3.2.4.3.1 It was noted that only a limited quantity packing instruction number was assigned to ID 8000 — **Consumer commodities** leaving no means for a shipper to prepare consumer commodities as a fully regulated shipment. There were operators that did not accept dangerous goods in limited quantities. Shippers would therefore not be able to offer a consignment of consumer commodities to those operators. The working group was invited to discuss this apparent anomaly.

3.2.4.3.2 It was confirmed that ID 8000 was intentionally restricted to transport in limited quantities. ID 8000 was unique to the air mode. The appearance of the “Y” limited quantity mark made it clear that the package was subject to the unique requirements by the air mode, effectively facilitating multi-modal transport. It was an operator’s prerogative to not carry ID 8000. Panel members believed the system was working as intended and did not see need to make any changes. It was noted during the discussion that “Limited quantities” did not appear in the heading of Packing Instruction 963 as was the case for other limited quantity packing instructions. This would be added.

3.2.4.4 UN 2590 — Asbestos Chrysotile (DGP-WG/17-WP/39)

3.2.4.4.1 A number of inconsistencies between the Technical Instructions and the UN Model Regulations with respect to asbestos were identified and a new packing instruction was proposed to address them. The working group agreed that some of the inconsistencies identified needed to be addressed, but that amending the existing packing instruction would be a simpler approach. The inconsistencies identified were:

- a) Combination packagings were not provided for in Packing Instruction 958, the packing instruction assigned to UN 2590 — **Asbestos, chrysotile**. The UN Model

Regulations did allow for them. It was agreed that not allowing them was likely unintentional and that there would be no reason not to allow them for transport by air.

- b) The maximum quantity permitted per single packaging was 200 kg for UN 2590 — **Asbestos, chrysotile** but was limited to 120 kg for jerricans and 50 kg for bags in the UN Model Regulations. It was noted that the 200 kg limit applied to all allowable packagings in Packing Instruction 958 and that specific limits for each type of packaging were not provided. The maximum net mass for steel and plastic jerricans was 120 kg and for bags was 50 kg by design in accordance with Part 6, so specifying a lower limit for these packagings would be unnecessary within the structure of the Technical Instructions.
- c) Certain types of single packagings with a removeable head were permitted in accordance with the UN Model Regulations but not in the Technical Instructions. It was suggested that only permitting non-removeable heads in the Technical Instructions was intentional.
- d) A particular packing provision was assigned to UN 2590 and UN 2212 in the UN Model Regulations allowing bags, provided they were transported in closed cargo transport units or placed in closed rigid overpacks which was not included in the Technical Instructions. It was suggested that this was also intentional, recognizing that closed cargo transport units were not permitted for transport of dangerous goods by air. There were specific requirements for bags to be palletized and unitized in Packing Instruction 958.
- e) UN 2212 — **Asbestos, amphibole** was forbidden for transport on both passenger and cargo aircraft. It was questioned whether this was justified. The working group wanted to assess the original reasoning for forbidding it before making a decision.
- f) The UN Model Regulations permitted transport of asbestos in limited quantities but there were no provisions for limited quantities in the Technical Instructions. A new limited quantity packing instruction for UN 2590 — **Asbestos, chrysotile** was also proposed. There were no comments on this proposal, other than the need for a revision to the maximum net quantity per package limit for limited quantities should the DGP agree to adopt the packing instruction.

3.2.4.4.2 A new proposal would be submitted to DGP/26 based on the discussions.

3.2.5 **Agenda Item 2.5: Part 5 — Shipper's Responsibilities**

3.2.5.1 **Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 5 (DGP-WG/17-WP/15)**

3.2.5.1.1 Draft amendments to Part 5 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. A dedicated working group was tasked with reviewing the amendments.

3.2.5.1.2 The ad hoc working group tasked with considering how the new provision for articles containing dangerous goods n.o.s. should be handled (see paragraph 3.2.2.1.3) determined that amendments to

Part 5;3 may be necessary in order to clarify the labelling requirements for an article that may also contain lithium batteries. The ad hoc group would develop any necessary amendments for incorporation in the DGP/26 working paper on UN harmonization.

3.2.5.1.3 The display of hazard labels was reformatted in the UN Model Regulations. The dedicated working group recommended against reformatting in the Technical Instructions.

3.2.5.1.4 It was agreed that DGP-WG/17-WP/15 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.5.2 Labelling and Marking — Provisions of a State Approval (DGP-WG/17-WP/20)

3.2.5.2.1 The addition of provisions providing an exception from the marking and labelling requirements for individual packages under certain conditions with the approval of the State of the Operator was proposed. The provisions included a requirement for the packages to be contained in an overpack with the labels and marks displayed on it.

3.2.5.2.2 The amendment was developed based on discussions at DGP-WG/16 (see paragraph 3.3.1 of the DGP-WG/16 Report) on a similar proposal. It had been argued that requiring marking and labelling on each individual package was onerous and unnecessary in cases where large quantities of dangerous goods were transported in overpacks from manufacturers in remote areas at airports with limited infrastructure to support the proper preparation of the goods for carriage. Cases of manufacturers not applying the cargo aircraft only label, which would not be required for the road segment of transit, or the shipper and consignee details on every individual package in consolidations involving one or more overpacks were cited. Although there had been no support for the proposal as written, there was some sympathy for the issue and acknowledgement that this had been an issue in at least one other State which had issued exemptions to facilitate transport of such consignments within that State.

3.2.5.2.3 While there was again sympathy for the issue raised, there was concern that a general provision in the Technical Instructions allowing an exception from the labelling provisions with the approval of the State of the Operator would have the unintended consequence of making this a routine practice. It was suggested that limiting the scope of the exception further may garner more support from the working group. The amendment was not agreed.

3.2.5.3 Labels not Related to the Contents (DGP-WG/17-WP/29)

3.2.5.3.1 Part 5;3.2.6 contained a requirement for labels which did not relate to the contents of a package to be removed. The provisions in 5;3.2.6 were predominantly related to radioactive material. An amendment to split the requirement for removing labels from the remaining provisions of 5;3.2.6 was proposed so as to make it clear that it applied to all packages, not just those containing radioactive material.

3.2.5.3.2 While there was sympathy for the intent of the proposal, it was not believed an amendment was necessary. The provision in 5;3.2.6 was a specific requirement for radioactive material intended to address the scenario of shippers returning empty packages which previously contained radioactive material. For this reason, it needed to stay in 5;3.2.6. Additionally, the scenario highlighted in the working paper might involve shippers of cargo other than dangerous goods who would be unaware of such a requirement in the Technical Instructions. Adding it would therefore be impossible to enforce. There was, however, a general shipper requirement in 5;1.1 h) for inappropriate dangerous goods labels

and marks to be removed or completely obliterated, and an operator would reject packages which did not comply with this requirement.

3.2.5.3.3 The proposal was withdrawn.

3.2.5.4 Affixion of Cargo Aircraft Only Label on Small Packages (DGP-WG/17-WP/43)

3.2.5.4.1 Applying the cargo aircraft only label on the same surface of the package near the hazard labels as required by 5.3.2.12 a) 3) was not always possible on small packages. Although there was little support for a proposed amendment to address this at DGP-WG/16, there was some sympathy for the problem. A new amendment was proposed to DGP-WG/17 which allowed for the label to be affixed on the nearest surface of the package when the package dimensions were not adequate enough for it to be affixed on the same side as the hazard labels, provided the package was placed in an overpack with the labels affixed on the same surface of the overpack.

3.2.5.4.2 There was little support for the proposal. The cargo aircraft only label was critical measure used to prevent dangerous goods permitted on cargo aircraft only from being loaded on a passenger aircraft. The label might be missed if it were not on the same surface as the hazard label(s). Although excepting a package from this requirement provided the labels were affixed on the same surface of the overpack could be considered a rational approach, the premise of the overpack provisions was that it could be broken up at any time to allow packages to go their separate ways. For this reason, the requirement needed to remain.

3.2.5.4.3 The proposer acknowledged the importance of the cargo aircraft only label, but noted that there were times when a package was prepared for road or sea transport, and consideration that the package needed to be big enough to affix all the labels was irrelevant. If the shipment unexpectedly needed to be shipped by air, it might no longer be in compliance. He invited members to consider ways that the issue could be addressed without compromising safety during the period before DGP/26.

3.2.5.4.4 The amendment was not agreed.

3.2.6 Agenda Item 2.6: Part 6 — Packaging Nomenclature, Marking, Requirements and Tests

3.2.6.1 Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 6 (DGP-WG/17-WP/16)

3.2.6.1.1 Draft amendments to Part 6 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. A dedicated working group was tasked with reviewing the amendments. There were no issues raised. It was agreed that DGP-WG/17-WP/16 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.6.2 Report of the DGP Working Group on Pressure Differential Requirements Applicable to Packagings Containing Radioactive Material (DGP-WG/17-WP/45)

3.2.6.2.1 A working group was convened prior to DGP-WG/17 to consider cases when the requirement for packages containing radioactive material to withstand, without loss or dispersal of

radioactive contents from the containment system, an internal pressure that produced a pressure differential of not less than the maximum normal operating pressure plus 95 kPa would be difficult to achieve. It was suggested that the requirement might have been excessively severe for low activity materials with little risk in the event of dispersion.

3.2.6.2.2 The working group was made up of radioactive material, airworthiness, aircraft operations and dangerous goods experts. The group reviewed the current requirements in the IAEA Regulations For The Safe Transport of Radioactive Material (SSR-6) and the associated provisions in Part 6;7 of the Technical Instructions. Airworthiness and aircraft operations experts briefed the group on depressurization issues which needed to be taken into account.

3.2.6.2.3 Radioactive material experts briefed the group on the risks associated with certain forms of radioactive material which were considered small and types of packaging which made compliance with the pressure differential requirements impossible to achieve.

3.2.6.2.4 The group was asked to consider whether a package design could be considered as meeting the requirement if the pressure differential was not maintained due to leakage of air provided that there was no loss or dispersal of radioactive material. The group agreed to this interpretation and recommended that additional guidance on the existing regulatory requirements would provide clarification. DGP-WG/17 was provided the draft material and invited to agree that it be submitted to the 34th meeting of the IAEA TRANSSC for consideration.

3.2.6.2.5 There were no objections to this approach.

3.2.7 Agenda Item 2.7: Part 7 — Operator's Responsibilities

3.2.7.1 Exception from Segregation Requirements for UN 3528 (DGP-WG/17-WP/1)

3.2.7.1.1 Engines powered by flammable liquids had been classified as miscellaneous dangerous goods prior to the 2017-2018 Edition of the Technical Instructions but had been reclassified as flammable liquids in that edition. This meant that these engines were required to be segregated from dangerous goods with a primary or subsidiary hazard of Division 5.1 in accordance with Table 7-1. A proposal to allow for an exception from the segregation requirements for these engines (UN 3528) was made, on the basis that they were not subject to any segregation requirements when they were classified as miscellaneous dangerous goods and there was no evidence of any incidents resulting from engines being loaded in close proximity to Division 5.1 dangerous goods.

3.2.7.1.2 There was some opposition to the proposal on the basis that it went against the general principle of segregating dangerous goods of Class 3 from dangerous goods of Division 5.1. It was suggested that the decision to allow an exception should be based on data proving that these engines would not react with Division 5.1 substances rather than the absence of incidents. There was also concern that the exception would be difficult to implement since segregation on the aircraft was normally performed by ground handling staff based on the labels displayed on the package. Others did not believe this was a reason not to allow the exception since it would be up to the operator to determine how to distinguish the engines from other Class 3 substances which did require segregation. Not being able to implement the exception would not be detrimental to safety. The amendment was agreed.

3.2.7.2 Clarification of the Use of Hold vs. Compartment (DGP-WG/17-WP/4)

3.2.7.2.1 It was noted that the terms “hold” and “compartment” were used interchangeably within the Technical Instructions to describe the area in an aircraft used for the carriage of baggage, mail and cargo. It was noted that the term “compartment” was used consistently in the *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481) with the various types defined there. A proposal to replace references to “hold” with “compartment” in the Technical Instructions was therefore made for the sake of consistency and clarity. It was suggested during discussion of the proposal that the term “cargo compartment” would be more explicit and consistent with terminology used in other documents. The proposal, as amended, was agreed.

3.2.7.3 Draft Amendments to the Technical Instructions to Align with the UN Recommendations — Part 7 (DGP-WG/17-WP/17)

3.2.7.3.1 Draft amendments to Part 7 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG16. No issues were identified. It was agreed that DGP-WG/17-WP/17 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.7.4 Passenger Notification System (DGP-WG/17-WP/27)

3.2.7.4.1 The provisions for information to passengers in Part 7;5.1.1 had been amended in the 2017-2018 Edition of the Technical Instructions to address cases when a passenger purchased a ticket and/or was issued a boarding pass electronically without any human interaction. A requirement for the system to include acknowledgement from the passenger that they had been presented with the information was added for such cases. An amendment to the provisions was proposed to extend this requirement to all passengers, including those where human interaction was involved. An alternate amendment was also proposed which included an indication of understanding of the restrictions on dangerous goods in baggage instead of simply acknowledging.

3.2.7.4.2 Support for the proposal was divided. Some believed the current provisions were clear and adequate. Others believed they were not so clear and could be improved. Some believed the requirement to indicate an understanding of the restrictions was unrealistic when taken literally, and therefore would be difficult to implement and cause delays. Others did not see this as anything complicated. A simple verbal acknowledgement or checkmark was all that was needed. This was a standard process used for many applications and did have the effect of signifying a level of importance to those concerned.

3.2.7.4.3 Alternate wording to clarify the intent would be considered at a future time, but the proposal as written was withdrawn.

3.2.7.5 Dangerous Goods Not Required to Appear in the Information to the Pilot-in-Command (DGP-WG/17-WP/30)

3.2.7.5.1 Packing Instruction 953 provided exceptions from full regulation for magnetized material of a certain field strength. Table 7-9 listed magnetized material, without specifying any field strength, as an item of dangerous goods which was not required to appear with the information to the pilot-in-command. Magnetized material with field strengths causing a compass deflection of more than 2 degrees

at a distance of 4.6 m could only be transported under an approval from the State of Origin and the State of the Operator. An amendment was therefore proposed to clarify that only magnetized material with a field strength causing a compass deflection of not more than 2 degrees at a distance 4.6 m was not required to appear with the information to pilot-in-command.

3.2.7.5.2 Some did not believe the amendment was necessary. Since magnetized material of this strength could only be transported with the prior approval of the State of Origin and State of the Operator, they were of the opinion that it would be up to those authorities to establish conditions, including what information should be provided to the pilot-in-command. Others supported the proposal. The table was meant as a guide, so adding the entry would not create unnecessary burden. The member nominated by IFALPA noted that pilots needed the information even if there was a small possibility of magnetic anomalies. Including the entry in the Table would help ensure that pilots were properly informed.

3.2.7.5.3 The amendment was agreed.

3.2.7.6 **Identifying and Detecting Dangerous Goods** (DGP-WG/17-WP/31)

3.2.7.6.1 Part 7;4.10 made it clear that that all relevant operator employees were subject to the training requirements of Part 1;4. It was understood that a specific reference to staff being adequately trained to assist them in identifying and detecting dangerous goods presented as general cargo in Part 7;1.1 was meant to emphasize the need for training of operators not knowingly handling dangerous goods. It was suggested, however, that this was redundant and could lead to confusion as references to training in relation to other specific operator responsibilities were not included. An amendment to Part 7;1.1 was therefore proposed which shifted the focus from a requirement to be trained to a requirement to be able to perform the functions of identifying and detecting dangerous goods as general cargo competently.

3.2.7.6.2 Although there was some support for introducing text that aligned with a competency-based training approach, members were concerned that the wording, if taken literally, would place an unattainable expectation on operator acceptance staff. The proposal was withdrawn.

3.2.7.7 **Simplified NOTOC for UN 3090 and UN 3480** (DGP-WG/17-WP/44)

3.2.7.7.1 An amendment to the provisions for information to the pilot-in-command with respect to lithium batteries (Part 7;4.1.3) was proposed to reflect the fact that UN 3480 — **Lithium ion batteries** and UN 3090 — **Lithium metal batteries** were forbidden on passenger aircraft.

3.2.7.7.2 Some members supported the amendment as it reflected reality and removed any potential uncertainty as to whether UN 3480 — **Lithium ion batteries** and UN 3090 — **Lithium metal batteries** were permitted on passenger aircraft. The majority of members did not believe the amendment was necessary since the prohibition on the transport of lithium ion batteries on passenger aircraft was expected to be temporary. Maintaining the text would eliminate the need to make a further change once the prohibition was removed.

3.2.7.7.3 The amendment was not agreed.

3.2.8 Agenda Item 2.8: Part 8 — Provisions Concerning Passengers and Crew

3.2.8.1 Draft Amendments to the Technical Instructions to Align with the UN Recommendations – Part 8 (DGP-WG/17-WP/18)

3.2.8.1.1 Draft amendments to Part 8 were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. It was noted that amendments proposed at DGP-WG/16 related to electronic baggage tags remained in square brackets pending the outcome of work from the Airworthiness Panel (AIRP) on the subject (see paragraph 3.5.3.1 of the DGP-WG/16 Report). The Secretary would keep DGP updated on progress made. No other issues were identified. It was agreed that DGP-WG/17-WP/18 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.2.8.2 Avalanche Rescue Backpacks and Other Personal Safety Devices Carried by Passengers and Crew (DGP-WG/17-WP/22)

3.2.8.2.1 It was noted that some of the requirements contained in the entry in Table 8-1 for avalanche rescue backpacks were not contained in the entry for small cartridges fitted into a self-inflating personal safety device (such as a life jacket or vest) and vice versa. An amendment merging the two entries into one generic entry for self-inflating personal safety devices was therefore proposed. The proposal maintained a separate entry for cartridges for devices other than self-inflating personal safety devices and limited the cartridges to gas so as to preclude the carriage of actuating cartridges. An additional restriction prohibiting the gas cartridge from being connected to the equipment was also proposed for this entry. When presenting the proposal, it was noted that some safety devices also had lithium batteries.

3.2.8.2.2 There was support for the proposal in principle, but a number of questions were raised:

- a) A passenger could carry one avalanche rescue backpack and one self-inflating personal safety device in accordance with the current provisions. The revised provisions would prohibit the passenger from carrying one of each. Was this justified?
- b) The amendment added a requirement for gas cartridges to be disconnected from the equipment. Was this justified?
- c) The amendment expanded the requirement for airbags within the devices to be fitted with pressure relieve valves so that they needed to be capable of preventing inflation within a confined space. Would this prevent the device from performing its intended function? Did specifying “within a confined space” provide any value?

3.2.8.2.3 A revised proposal would be developed for submission to DGP/26 taking into account the questions raised.

3.2.8.3 Battery-Powered Equipment Capable of Generating Extreme Heat Carried by Passengers and Crew (DGP-WG/17-WP/23)

3.2.8.3.1 An amendment to the provisions for battery-powered equipment capable of generating extreme heat (Item 16), portable electronic devices containing lithium batteries (Item 20) and portable electronic equipment containing a non-spillable battery (Item 27) was made to address inconsistencies. These included:

- a) Battery-powered equipment capable of generating extreme heat (Item 16) did not address the fact that:
 - 1) the batteries might be lithium and as such would need to be subject to energy density limits and the applicable tests of the UN *Manual of Tests and Criteria* in accordance with the entry for portable electronic devices containing lithium batteries (Item 20));
 - 2) the batteries might be non-spillable and as such would need to be subject to energy density limits and meet the requirements of Special Provision A67 in accordance with the entry for non-spillable batteries (Item 27)); and
 - 3) the item should be restricted to the carriage by passengers or crew for personal use as was the case for portable electronic equipment containing lithium batteries (Item 20) and non-spillable batteries (Item 27); and
- b) portable electronic equipment containing lithium batteries (Item 20) and non-spillable batteries (Item 27) did not address the need to isolate a heat-producing component from the battery if the equipment was capable of generating extreme heat.

3.2.8.3.2 There was support for the proposal in principle, but long-standing concerns with whether some of the provisions could be understood by or reach passengers were raised (e.g. references to Special Provision A67). Attempts were made to address these in a separate proposal to restructure Part 8 (see paragraph 3.2.8.7). A new proposal would be developed for submission to DGP/26 based on the comments raised during this discussion and the discussion of the proposal to reformat Part 8 (see paragraph 3.2.8.7).

3.2.8.4 Mobility Aids Powered by Lithium Ion Batteries (DGP-WG/17-WP/3)

3.2.8.4.1 Challenges related to the carriage of mobility aids powered by lithium batteries were discussed. It was noted that lithium ion batteries had become the battery of choice for powering electric wheelchairs and mobility aids. The meeting was informed of work being undertaken by an IATA mobility aid working group aimed at developing a guidance document for passengers, mobility aid manufacturers, ground handling agents and operators. IATA had also been accepted as a liaison member on an International Organization for Standardization (ISO) working group developing standards for batteries and chargers for wheelchairs (ISO TC 173/SC 1/WG 10). IATA intended to advise the ISO group of air transport requirements for lithium battery-powered wheelchairs and mobility aids. The meeting was invited to consider air transport requirements that should be considered for inclusion in the ISO standard.

3.2.8.4.2 The working group noted its appreciation for the work undertaken by IATA and for being given the opportunity to comment. Establishing an international standard for the batteries and chargers

could significantly help in ensuring they are safely manufactured and designed in a manner that would enable safe handling and transport by air. Having IATA as a liaison member provided an excellent opportunity for ensuring aviation needs were being met.

3.2.8.4.3 Several members cautioned against referencing an external organization's standard in the Technical Instructions. There was potential for misalignment between the ISO standard and the Technical Instructions depending on the timing of revisions. In any event, there was no guarantee that manufacturers would comply with these standards. It was also suggested that mobility aid manufacturers only became aware of transport requirements after the fact, when customers complained. There was therefore a strong preference for the ISO standard to reference the Technical Instructions and not the other way around.

3.2.8.4.4 The need for close coordination between the different stakeholders, i.e. passengers, ground handling agents, operators, mobility aid manufacturers and standard making organizations was recognized, and any forum which would facilitate this was supported. The presenter assured the working group that its views would be brought to the ISO working group. An update on progress made would be provided to DGP/26.

3.2.8.5 Carriage of Electric Mobility Aids (DGP-WG/17-WP/24)

3.2.8.5.1 An amendment aimed at addressing operational issues and safety concerns related to the carriage of mobility aids powered by non-spillable, spillable and lithium ion batteries was proposed (Items 5), 6) and 7)). These included:

- a) a note, based on an existing ISO standard, indicating that mobility aids would be required to be equipped with a means of electrically disconnecting the battery set or removing the battery set without the use of a tool from 1 January 2025. The intent of the note was to address the fact that there were many different types of electric mobility aids, making it difficult for ground personnel to know how to isolate circuits to prevent accidental operation. It was suggested that the requirement would encourage manufacturers to design wheelchairs with this feature and provide a reasonable transition period;
- b) a modification to the requirement for mobility aids to be carried in a manner that protected them from being damaged from the movement of baggage, mail, stores or other cargo to explicitly require that those with installed batteries be secured to prevent movement;
- c) a modification to the requirement for spillable and lithium batteries to be removed from mobility aids specifically designed to allow their removal so as to only require this when the mobility aid could not be secured to prevent movement, when the battery could not be securely attached or when electrical circuits could not be isolated or the battery could not be protected from short circuits. The intent was to address the possibility that removing the battery would not always enhance safety and introduced complexity to ground handling process.

3.2.8.5.2 The working group was also invited to consider:

- a) whether Watt-hour rating limits should be established for lithium ion batteries powering mobility aids not designed to allow their removal, noting that a limit of 300 Wh was established for those that were designed to be removed;

- b) permitting the carriage of spare batteries for passengers with restricted mobility, recognizing the potential for passengers wishing to use the battery with equipment located at their destination.

3.2.8.5.3 Although there was support for the objective of the note, there were doubts that putting it in the passenger provisions would encourage manufacturers to do anything. There were also concerns that including it implied a passenger responsibility and would effectively forbid old wheelchairs from being carried, both of which could be considered an infringement on rights. It was suggested that a better approach would be to communicate the needs of the aviation industry to manufacturers and associations for persons with reduced mobility (see paragraph 3.2.8.4).

3.2.8.5.4 There was little support for establishing a Watt-hour rating limit for lithium ion batteries powering mobility aids not designed to allow their removal. While some advocated for the consistent application of limits based on safety, the rights of persons with reduced mobility would make it impossible for operators to enforce those limits.

3.2.8.5.5 There was support for the amendment explicitly requiring mobility aids with installed batteries to be secured to prevent movement, although the term “bracing” was not clear to all. There was also agreement that removing a battery from the mobility aid when the mobility aid was specifically designed to allow this would not always enhance safety and should therefore not be required. It was suggested that this issue had been addressed in another amendment proposal which further simplified the provisions by moving those which applied specifically to the operator to Part 7 (see paragraph 3.2.8.6). That amendment was agreed in principle, but some modifications were necessary which would be made in a revised amendment to DGP/26. The proposers of each amendment would work together to ensure that all issues identified were addressed.

3.2.8.6 Battery Powered Mobility Aids (DGP-WG/17-WP/34)

3.2.8.6.1 A proposal to simplify the provisions for battery-powered mobility aids had been raised at DGP/25 (see paragraph 2.8.3 of the DGP/25 Report) and again at DGP-WG/16 (see paragraph 3.2.8.2 of the DGP-WG/16 Report). A revised amendment was presented to DGP-WG/17 to address comments raised at those meetings. The amendment merged the three separate entries for mobility aids powered by spillable, non-spillable and lithium ion batteries into one entry. The proposed single entry limited the provisions to those that were within the passenger’s control and moved provisions that were the responsibility of the operator into the storage and loading chapter of Part 7. References to “collapsible” mobility aids were removed in response to the conclusion reached at DGP WG/16 that the ability of a mobility aid to be collapsible was irrelevant as long as the battery was protected.

3.2.8.6.2 There was support for the proposal in principle, although a number of comments were raised that needed to be addressed. A revised proposal would be prepared for submission to DGP/26. The proposal would take into account amendments supported under discussions aimed at addressing operational issues and safety concerns related to the carriage of mobility aids powered by non-spillable, spillable and lithium ion batteries (see paragraph 3.2.8.5).

3.2.8.7 Revision to Part 8 (DGP-WG/17-WP/35)

3.2.8.7.1 DGP/25 had been invited to comment on revisions aimed at simplifying the passenger provisions in Table 8-1 for incorporation in the 2019-2020 Edition of the Technical Instructions (see paragraph 2.8.4 of the DGP/25 Report). The list was simplified by grouping entries according to their hazard and function. This allowed for the removal of redundant text that had been repeated in the existing provisions. Work on simplifying the list continued at DGP-WG/16 (see paragraph 3.2.8.3 of the

DGP-WG/16 Report). A revised proposal was presented to DGP-WG/17 to address comments raised at DGP/25 and DGP-WG/16.

3.2.8.7.2 Other amendments were proposed in addition to restructuring the table into generic groupings, including:

- a) A modification to the provisions preceding the table was made restricting carriage of dangerous goods permitted to passengers or crew for personal use only. This was an attempt to prevent salespersons and retailers from carrying large quantities of items in accordance with the provisions for passengers and crew, something which had been reported;
- b) The entries for lithium batteries were merged into one entry for all types of equipment containing them;
- c) The “on the person” column was removed as the requirement for passengers to carry dangerous goods “on the person” applied only to lighters and matches. The requirement was included with the other restrictions for those articles;
- d) Entries for non-radioactive medicinal articles (including aerosols), toiletry articles (including aerosols) and aerosols of Division 2.2 with no subsidiary risk, for sporting or home use, were merged into one entry because of their similar restrictions; and
- e) A separate Table 8-2 was created for items not intended to be carried by the average passenger, such as instruments carried by the Organization for the Prohibition of Chemical Weapons, into a separate Table 8-2

3.2.8.7.3 There was strong support for the amendment in principle and appreciation for the work done. A number of suggestions for improvement were made, including:

- a) New introductory text listing articles that may be carried on other modes of transport but which were prohibited from carriage by passengers or crew by air was ambiguous. While there may be value in highlighting dangerous goods which passengers commonly attempt to carry which are in fact prohibited under any circumstance, it should be made clear that anything not listed in Table 8-1 was prohibited.
- b) The number of restrictions added over the years made the table complicated. Some of the restrictions were difficult if not impossible for passengers to comply with. Simplification was needed in order to make the restrictions clear to passengers and to staff processing passengers and baggage.
- c) The hazards and degree of risk posed by the dangerous goods listed in Table 8-1 should be highlighted in some manner. This would assist operators in applying a risk-based approach in dealing with passengers.

3.2.8.7.4 A revised proposal would be prepared for submission to DGP/26. A number of panel members volunteered to help the proposer in developing it.

3.3 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 9284SU) for incorporation in the 2019-2020 Edition

3.3.1 Draft Amendments to the Supplement to the Technical Instructions to Align with the UN Recommendations (DGP-WG/17-WP/19)

3.3.1.1 Draft amendments to the Supplement were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. A dedicated working group was tasked with reviewing the amendments. No changes were made. It was agreed that DGP-WG/17-WP/19 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.4 Agenda Item 4: Development of recommendations for amendments to the *Emergency Response Guidance for Aircraft Incidents involving Dangerous Goods* (Doc 9481) for incorporation in the 2019-2020 Edition

3.4.1 Emergency Response Guidance (Doc 9481) Drill No. 9 Entries (DGP-WG/17-WP/8)

3.4.1.1 DGP-WG/16 agreed to the addition of a new aircraft emergency response drill code number “12” in Table 4-1 for assignment to lithium ion and lithium metal batteries. Guidance for the new number was developed which better characterized the inherent risk of lithium batteries, and drill code “12FZ” was assigned to the two entries in Tables 4-2 and 4-3. It was suggested that reference to drill letters “Z” and “W” under the firefighting procedure and additional considerations column for drill number 9 were no longer needed as these had been included specifically for lithium batteries. An amendment deleting these reference was therefore proposed.

3.4.1.2 The amendment was agreed.

3.4.2 Draft Amendments to the Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods (DGP-WG/17-WP/40)

3.4.2.1 Draft amendments to the *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481) were proposed to reflect the decisions taken by the UN Committee of Experts on the Transport of Dangerous Goods. The amendments were consolidated with amendments agreed by DGP-WG/16. A dedicated working group was tasked with reviewing the amendments. The ad hoc working group tasked with considering how the new provision for articles containing dangerous goods n.o.s. should be handled noted that drill codes would need to be assigned to each of the new entries (see paragraph 3.2.2.1.3). It was agreed that DGP-WG/17-WP/40 would be further reviewed by panel members, and any discrepancies would be incorporated in the DGP/26 working paper on UN harmonization.

3.5 Agenda Item 5: Specific work items identified by the Air Navigation Commission

3.5.1 Agenda Item 5.1: Aviation security/dangerous goods coordination (ANC job card DGP.001.01)

3.5.1.1 Personal Electronic Devices in Checked Baggage (DGP-WG/17-WP/46)

3.5.1.1.1 The Secretary briefed the working group on an informal Council briefing on recent security restrictions requiring passengers and crew to place large personal electronic devices (PEDs) in checked baggage on certain flights. ICAO recognized that this would result in a greater numbers of PEDs powered by lithium batteries in cargo compartments than would have previously been the case. An electronic bulletin had been sent to all States advising of ensuing safety risks and recommending measures that could be taken to mitigate them (EB 2017/23). Affected States and international organizations had issued similar notices.

3.5.1.1.2 The President of the Council had stressed that security and safety threats needed to be treated equally and that cooperation between those responsible for each was of utmost importance. A number of Council members had emphasized the need for the Dangerous Goods Panel (DGP) to consider whether amendments to the dangerous goods provisions were necessary to address the safety risks. Accordingly, the Secretary invited the working group to consider what measures could be taken. She noted that the Aviation Security Panel (AVSECP) would be meeting from 29 May to 2 June 2017 and that there would likely be another Council meeting on the subject before then. She invited the working group to consider the need to provide any guidance or raise concerns to those or any other relevant bodies.

3.5.1.1.3 Several panel members and observers expressed discontent with the apparent lack of coordination between security and safety before the security restrictions were announced. States and industry were forced to react quickly at high cost to mitigate risks resulting from the restrictions. Some panel members noted that their State regulations required safety risk assessments before security restrictions were adopted. This, however, was not the case everywhere. While the need to keep intelligence information classified was recognized, this should not impede the sharing of information necessary to sustain safety. Members and observers stressed the importance of coordination before imposing restrictions in order to avoid the need for reactionary measures in the future.

3.5.1.1.4 The working group was asked to consider incorporating the mitigation measures recommended in EB 2017/23 in the Technical Instructions by amending the safety risks assessment provisions of Part 7 and the passenger provisions in Part 8. The amendment would highlight the need to take the potential impact of security restrictions into account in their safety risks assessments and the need for personal electronic devices in checked baggage to be protected from damage and unintentional activation.

3.5.1.1.5 Panel members were opposed to specifically referring to the impact of security restrictions with respect to safety risk assessments. Safety risk assessments needed to be re-evaluated after any change in the operational environment, not just security. A revised amendment to reflect this was agreed. However, panel members and observers reiterated the need for those with responsibility for security to communicate with those with responsibility for safety before security restrictions were issued. An effective risk assessment, including the implementation of controls to mitigate risks, depended on this.

3.5.1.1.6 The amendments to the passenger provisions were agreed, although one observer did not believe the additional restrictions would effectively mitigate the risks as they were complicated and

unclear. He noted that the check-in process was complex, which increased the potential for human error. The provisions therefore needed to provide detailed technical specifications that were easy to understand and implement.

3.5.1.1.7 While there was recognition that the amendments could not mitigate all risks, there was unanimous agreement among panel members that they did introduce measures which would enhance safety. On that basis, the working group recommended that the amendments be incorporated in the 2017-2018 Edition of the Technical Instructions by way of an addendum, rather than integrating them in the amendments for the 2019-2020 Edition that would be reviewed by DGP/26. Accordingly, the Secretary was asked to bring the request for an addendum to the ANC.

3.5.2 Agenda Item 5.2: Dangerous goods accident and incident reporting system (ANC job card DGP.002.01)

3.5.2.1 Report of the Working Group on Reporting (DGP-WG/17-IP/2)

3.5.2.1.1 An update on work undertaken by the DGP Working Group on Reporting (DGP-WG/Reporting) was provided. DGP-WG/Reporting met in Ottawa on 20 and 21 April 2017 to review guidance material on reporting and investigating which had been developed via WebEx meetings and email correspondence prior to that meeting. The guidance material was intended to support the proposed new Annex 18 compliance and reporting provisions (see paragraph 3.5.2.1 of the DGP-WG/16 Report). These provisions, currently contained in Chapters 11 and 12 of Annex 18, were revised with the aim of alignment with Annexes 13 and 19 and removing, whenever practicable, redundancies.

3.5.2.1.2 The working group determined the need to clearly distinguish between official accident investigations that would be subject to Annex 13 — *Aircraft Accident and Incident Investigation* and investigations that would be prompted by dangerous goods occurrences. The group became aware of simultaneous work being undertaken by ICAO's safety management experts on guidance material for "safety investigations" and consulted with them on the subject. This material would be included in the next edition of the *Safety Management Manual (SMM)* (Doc 9859). Additional material on reporting would also be included in that edition. There was a conclusion that coordination between the reporting group and the safety management experts would be beneficial to both during the development process. The DGP-WG/Reporting would review the safety management material once it was received by the safety management experts. An initial draft of the safety management material was expected in Summer 2017. DGP-WG/Reporting would then align its dangerous goods reporting and investigation material with the safety management guidance. DGP-WG/Reporting would take a similar approach as the one taken in aligning Annex 18 with Annex 19 and remove, whenever practicable, redundancies.

3.5.2.1.3 DGP-WG/Reporting would continue developing guidance material for investigation and reporting and ensure it aligned with the new safety management material. A mature draft would be presented to DGP/26.

3.5.3 Agenda Item 5.3: Mitigating risks posed by the carriage of lithium batteries by air (ANC job card DGP.003.01)

3.5.3.1 Restricting the Packing, Overpacking and Loading of Lithium Batteries with Flammable Dangerous Goods (DGP-WG/17-WP/6)

3.5.3.1.1 Whether or not additional segregation requirements for lithium batteries and flammable materials should be included for inclusion in Part 7 was considered at DGP-WG/16. Although there was support for segregation of lithium batteries in principle, a number of concerns were raised and documented in the report (see paragraph 3.5.3.3 of the DGP-WG/16 Report). DGP-WG/17 was invited to consider proposed amendments to Parts 4 and 7. The proposal included:

- a) amendments to Packing Instructions 965 (lithium ion batteries) and 968 (lithium metal batteries) prohibiting the following dangerous goods:

- 1) Class 1 (other than Division 1.4S);
- 2) Division 2.1;
- 3) Class 3;
- 4) Division 4.1; or
- 5) Division 5.1;

from being packed in the same outer packaging with lithium batteries packed in accordance with Section IA or IB or from being placed in an overpack with lithium batteries packed in accordance with Section II;

- b) Amendments to Section II of Packing Instructions 965 (lithium ion batteries) and 968 (lithium metal batteries) prohibiting cells and batteries from being packed in the same outer packaging with other dangerous goods;

- c) amendments to the segregation requirements in Part 7;2 requiring packages and overpacks containing lithium batteries prepared in accordance with Sections IA or IB of Packing Instructions 965 and 968 to be segregated from packages or overpacks containing dangerous goods hazard labels of:

- 1) Class 1 (other than Division 1.4S);
- 2) Division 2.1;
- 3) Class 3;
- 4) Division 4.1; or
- 5) Division 5.1.

3.5.3.1.2 While there was support for the proposal in principle, some concerns were raised including:

- a) Segregation could create another risk from an accumulation of lithium batteries in one area. The proposer noted that there was nothing in the Technical Instructions that would limit the number of packages of lithium batteries in a cargo compartment; if this were considered a safety risk, it should be addressed but should not be considered justification against segregation;
- b) Some did not see the need to include segregation requirements in the packing instructions. This was not done for any other dangerous goods, as these provisions were contained in Parts 4;1.1.9 and 5;1.1. Others believed that extra guidance was needed for shippers of lithium batteries, and the packing instructions for lithium batteries had been developed with this in mind.
- c) Singling out a specific item of dangerous goods in Table 7-1 went against the general philosophy of the table, which was hazard based. A need to segregate only one item of a particular class may signify a different problem that should be addressed.
- d) Segregation was normally performed by ground handling staff based on the hazard labels displayed on the package. The fact that lithium battery hazard labels were also on packages of lithium batteries packed with and contained in equipment would complicate this process. The proposer noted that the amendment had been endorsed by the IATA Dangerous Goods Board and suggested that this was an indication that operators could deal with the complexity.
- e) Some believed segregation should also be applied to lithium batteries contained in or packed with equipment and lithium batteries prepared in accordance with Section II, although it was recognized that the absence of an acceptance check for Section II batteries would make this difficult to achieve.
- f) Some questioned why the proposal did not require lithium batteries to be separated from Division 4.2 substances (Substances liable to spontaneous combustion). The proposer noted that it was an intentional decision to exclude these substances as he did not consider it necessary as almost all of the Division 4.2 substances required a large volume and significant time to present a hazard in transport.

3.5.3.1.3 The majority supported the proposal. The investigation of the 28 July 2011 in-flight fire and crash of Asiana Airlines Flight 991 led to the conclusion that the proximity of flammable liquids to the lithium ion batteries in a single location on board the aircraft had contributed to the severity of the incident. One of the safety recommendations following the investigation included physical segregation of Class 3 flammable liquids from Class 9 lithium batteries. The amendment addressed that specific recommendation. The amendment was agreed.

3.5.3.2 Dangerous Goods Training for Shippers of Section II Lithium Batteries (DGP-WG/17-WP/25)

3.5.3.2.1 An amendment to Section II of Packing Instructions 965 and 968 was proposed to require all persons preparing or offering cells or batteries for transport to complete appropriate dangerous goods training as per Part 1;4. It was suggested that the original justification for requiring “adequate instruction” for shippers offering Section II battery consignments was based on the thought that full training was

onerous given the fact that these batteries were already excepted from most of the provisions of the Technical Instructions. However, since that time the volume of batteries had significantly increased, several exceptions had been removed, and complex changes to the lithium battery provisions had been made. It was therefore suggested that “adequate instruction” was no longer sufficient. It was also suggested that the move towards a competency-based training approach made subjecting relevant persons to the full training requirements practical.

3.5.3.2.2 There was mixed support for the proposal. Some thought subjecting shippers to the current training requirements of Part 1;4 would be onerous. While there was agreement that a competency-based approach to training would make full training less onerous, the competency-based training provisions had not yet been adopted. Others questioned whether there was any value in keeping Section II as so many of the exceptions it had originally provided had since been removed. These members believed a better approach would be to eliminate it. Doing so would also improve hazard communication to the operator, something many felt was necessary.

3.5.3.2.3 The amendment was not agreed.

3.5.3.3 **Applicability of Section IA (DGP-WG/17-WP/28)**

3.5.3.3.1 Whether or not the introductory text of Packing Instructions 965 and 968 for Section IA could be interpreted to mean that shippers would not be permitted to package their cells or batteries in accordance with Section IA if the Watt hour rating or lithium metal content did not exceed the limits established for that section had been discussed at DGP-WG/16 (see paragraph 3.5.3.12 of the DGP-WG/16 Report). DGP-WG/16 agreed that it was not the intent to preclude anyone from applying more stringent requirements and that an anomaly had inadvertently been introduced that should be clarified in order to remove any ambiguity. An amendment was proposed to correct it, but the working group could not agree to the wording used.

3.5.3.3.2 Two options for amendment to the introductory text to Packing Instructions 965 and 968 to address the issue were proposed to DGP-WG/17. The first specified that Section II applied to batteries or cells exceeding the Watt-hour limits *or* the quantity limitations established in Section IB. The second removed watt-hour rating limits in the criteria for Section IA and replaced “applies” with “may apply” in the criteria for Sections IB and II in an attempt to eliminate any notion that using Section IA was prohibited.

3.5.3.3.3 Although there was support for the first option in principle, there remained concerns that the wording would preclude usage of Section IA if the batteries or cells were within the limits established for Sections IA or IB. A revised proposal would be prepared for submission to DGP/26.

3.5.3.4 **Information to the Pilot-in-Command on Lithium Batteries Section II (DGP-WG/17-WP/33)**

3.5.3.4.1 A proposal to remove the exception from the requirement to notification to pilot-in-command for lithium batteries prepared in accordance with Section II of Packing Instructions 965 and 968 was presented. It was argued that the relief provided by Section II contradicted the high risks posed by lithium batteries and that the lack of notification to the pilot-in-command could result in the application of inappropriate emergency response procedures in the event of an incident.

3.5.3.4.2 Although some panel members emphasized the importance of having this information and questioned how operators were conducting effective safety risk assessments without it, the majority believed the requirement would be difficult if not impossible to implement without subjecting the

batteries to full regulations. Some large integrators were not accepting battery consignments prepared in accordance with Section II because of this. Other operators had established alternate methods for collecting information related to Section II lithium batteries and providing it to the pilot-in-command, but it was suggested that these methods could not be 100 per cent accurate and that operators would be non-compliant if mandated. Some panel members repeated the argument that Section II should be eliminated altogether, noting that it had been proposed several times in the past without sufficient support.

3.5.3.4.3 The amendment was not agreed.

3.5.3.5 **Defective Lithium Batteries — Improving the Integrity of Aviation Safety (DGP-WG/17-WP/36)**

3.5.3.5.1 Special Provision A154 prohibited from transport lithium batteries identified by the manufacturer as being defective for safety reasons, or that had been damaged, that had the potential of producing a dangerous evolution of heat, fire or short circuit. An amendment to address changes in technology and lessons learned from recent recalls was proposed. The amendment included:

- a) An extension of the prohibition to devices containing lithium batteries, recognizing that some personal electronic devices contained batteries that could not be removed;
- b) Inclusion of a State agency responsible for consumer safety as an entity that might identify a battery or devices containing batteries as being defective;
- c) Guidance in the form of a note on the type of information that should be included in a recall, replacement or prohibition notice; and
- d) A recommendation that manufacturers or relevant State agencies provide specific information to their appropriate national authority and to ICAO to allow for better communication between affected States.

3.5.3.5.2 There was unanimous agreement that the guidance provided in the note was helpful, but little support for including guidance directed at manufacturers in the Technical Instructions. The proposer would consider other methods of disseminating the guidance to the appropriate entities, taking comments raised during discussion into account.

3.5.3.6 **Laser Plasma Lighters (DGP-WG/17-WP/37)**

3.5.3.6.1 The working group was invited to consider adding a new entry for battery-powered lighters in Table 8-1. This would account for new types of lighters on the market powered by lithium batteries including laser plasma lighters, sometimes marketed as tesla coil lighters, flux lighters, arc lighters and double arc lighters. While this device could be considered a portable electronic device containing lithium batteries, it was suggested that creating a new entry might have the effect of shaping manufacturer's designs of these devices to include one or more safety measures. The entry was split into two based on whether or not the device was equipped with a safety cap or means of protection against unintentional activation. Those without were marked as forbidden for carriage

3.5.3.6.2 The amendment was agreed in principle, although some did not see reason for two entries or for listing examples. The amendment was placed in square brackets pending finalization of amendments to restructure the passenger provisions (see paragraph 3.2.8.7). The amendment would be modified to align with the restructured provisions if necessary.

3.5.3.7 Power Packs & Spare Batteries (DGP-WG/17-WP/38)

3.5.3.7.1 A number of incidents involving power banks had been reported in the cabin. An amendment aimed at mitigating the risks they posed was therefore proposed.

3.5.3.7.2 An analysis of reported incidents in one State identified power banks as one of the top “least wanted” dangerous goods. The member nominated by IATA noted that cabin safety operations experts had done an analysis of incidents in the cabin, and power banks were on the top of the list in terms of frequency of occurrence of thermal runaway. Power banks were being mass produced with limited government oversight or enforcement of product safety standards. It was difficult for operators or passengers to establish whether the batteries and/or cells in the power banks had been subjected to the tests specified in subsection 38.3 of the UN *Manual of Tests and Criteria*, and it was suggested that many were not. The proposer cited aviation’s experience with hoverboards and e-cigarettes as similar areas where there had been a massive leap in cheap, mass-produced articles with limited regulatory or consumer and product safety oversight, where regulators and airlines had had to respond quickly.

3.5.3.7.3 The Technical Instructions required lithium cells or batteries whose primary purpose was to provide power to another device to be carried as spare batteries. Despite this requirement, power banks were still often erroneously considered as personal electronic devices (PEDs). Power banks did not offer the same level of protection that was provided to batteries contained in personal electronic devices. For this reason, the amendment proposed specifically required power banks to be subject to the same additional restrictions as spare batteries. The amendment also proposed prohibiting spare batteries and power banks from being recharged or from being electrically connected or providing power to an external device as a method of risk mitigation. The proposal did not affect the ability to use aircraft power points to power PEDs.

3.5.3.7.4 While there was strong support for the amendment in principle, some suggested it would be difficult if not impossible to enforce. In response to queries as to why the additional restrictions were not applied to spare batteries exceeding a watt-hour rating of 100 Wh, it was explained that this was intentional as such batteries were only permitted with the approval of the operator. It was considered more appropriate to leave it to the operator to decide whether to permit the carriage of such items and, if so, whether they should be permitted for use during flight so as not to preclude a passenger from doing so when an operator considered it to be justified and safe. Some panel members maintained support for extending the additional restrictions to batteries with a watt-hour rating exceeding 100 Wh, but the majority did not based on the explanation provided.

3.5.3.7.5 It was recognized that a preferred solution would be an objective outcome-based approach that would automatically capture emerging technological devices powered by batteries. It was envisaged that a restructured Part 8 might achieve this (see paragraph 3.2.8.7). However, given the risks identified, it was deemed inappropriate to wait until DGP/26 to recommend the amendments for incorporation in the 2019-2020 Edition of the Technical Instructions. Recognizing that the amendments did enhance safety, it was therefore felt an addendum to the 2017-2018 Edition of the Technical Instructions was justified. The Secretary would bring the request for an addendum to the ANC.

3.5.3.8 Number of Spare Lithium Batteries Packed with Equipment (DGP-WG/17-WP/41)

3.5.3.8.1 An amendment to the packing instructions for lithium ion and lithium metal batteries packed with equipment (Packing Instructions 966 and 969) was proposed to clarify the intent of the limit applied to the number of spare batteries permitted in a package. The provisions in Sections I and II of the packing instructions limited the number of batteries or cells to the number needed for the equipment’s

operation plus two spares. It was noted that there were some devices that required multiple cells or batteries to power them and suggested that for such cases the number of spares permitted for each device was not clear in the existing text. An amendment to the packing instructions was proposed to clarify this.

3.5.3.8.2 The working group agreed that the intent of the provision was to allow for two sets of spares and that the provision should be modified to remove any ambiguity. However, there was still ambiguity in the proposed wording. The proposer would consider developing a revised proposal for submission to DGP/26.

3.5.4 Agenda Item 5.4: Scope of Annex 18 (ANC job card DGP.004.01)

3.5.4.1 Revision to the Applicability of Annex 18 (DGP-WG/17-WP/26)

3.5.4.1.1 An amendment to the training requirements of Chapter 10 was proposed in an effort to ensure entities not knowingly handling dangerous goods were subject to Annex 18 and the Technical Instructions. It was developed in follow-up to discussions on whether or not States had oversight authority over entities not knowingly involved with transporting dangerous goods by air which had been raised during the development of the new competency-based training provisions for dangerous goods (see paragraph 3.2.1.6 of this report and paragraph 1.2 of the DGP/25 Report). Although the existing training requirements in the Technical Instructions had mandated training of freight forwarders processing and handling general cargo, some panel members reported that this was not possible within the dangerous goods legal framework of their States. The ICAO Legal Bureau's position was that training for freight forwarders not handling dangerous goods could be recommended but not mandated in Annex 18. While there were differences of opinion among panel members on what was legally possible, there was recognition that entities processing general cargo could play a role in preventing undeclared dangerous goods from entering the air transport stream.

3.5.4.1.2 The majority of panel members strongly supported the proposal, although there were a large number that did not. All agreed that the risk of undeclared dangerous goods entering the air transport stream needed to be mitigated, but several panel members did not agree the amendment proposed was the answer. For some, mandating training for entities not performing dangerous goods functions in their State was not legally possible. Their opinion was that mandating training based on a job title went against the function-based approach applied when developing the provisions for Annex 18 and the Technical Instructions. This approach provided legal authority to regulate entities performing any function prescribed in the Annex or the Instructions. They also believed the title-based approach went against the principles of competency-based training which was advocated by ICAO and was being incorporated in the dangerous goods training provisions. Noting that the ICAO Legal Bureau's position had been that training for freight forwarders not handling dangerous goods could be recommended but not mandated in Annex 18, it was questioned whether the scope could in fact be expanded legally. In this regard, input on the proposal from the Legal Bureau would need to be sought. Notwithstanding the Legal Bureau's input, it was noted that the operator's safety management responsibilities needed to be taken into account and questioned why an operator would accept goods from forwarders not trained commensurately if there was a risk of undeclared dangerous goods being offered. Some commented that cargo was often consolidated several times, causing a lack of transparency of the logistics chain to the carrier and therefore inhibiting the operator's ability to ensure all forwarders in the supply chain had received training. The Secretary suggested that this might contradict safety management principles and security requirements.

3.5.4.1.3 Some of those who supported the proposal were of the opinion that States not mandating training were in breach of the regulations as Annex 18 required training programmes to be established and maintained in accordance with the Technical Instructions and the Technical Instructions did require training for all freight forwarders. They argued that even if freight forwarders were not processing dangerous goods, they would be subject to Annex 18 once dangerous goods were introduced, even if unknowingly. They did not support the notion that the proposal contradicted a competency-based training approach. In their opinion, the Standard was directed at the entities or organizations providing the training, not the personnel performing the functions. While they had sympathy for those States that did not have legal authority over entities not performing dangerous goods functions and that expanding authority could take several years to achieve, they did not believe this to be reason not to proceed.

3.5.4.1.4 The Secretary cautioned against making a decision on the proposal in haste before DGP/26 and stressed the importance of consensus. While not arguing against the basic premise, a method that worked in all States needed to be established. She noted that it would be difficult to justify mandatory training for freight forwarders of general cargo when the same was not required for shippers of lithium batteries excepted from full regulation. Replies to a State letter seeking data on the scope of oversight authority among Contracting States indicated that almost one third of those responding did not have oversight authority over freight forwarders not knowingly processing dangerous goods. A method of addressing the risk that would work in all States needed to be the ultimate goal so as to avoid the need for States to file differences to Annex 18. The meeting was reminded that although the ANC had tasked the panel with addressing the risk of entities processing general cargo unknowingly introducing dangerous goods into the air cargo stream, it did not specify that this needed to be done solely through Annex 18 or the Technical Instructions. Provisions in other Annexes could therefore be considered to help achieve the objective. DGP-WG/16 had agreed to the establishment of a working group. A better approach would be to have that working group look at the problem from all angles with the support of legal, safety management and other relevant experts. In this way, a solution for all States might be achieved.

3.5.4.1.5 The Secretary acknowledged that the Technical Instructions could be interpreted as requiring training for all freight forwarders, but the decision to do so was based on preliminary legal advice. A corresponding amendment to Annex 18 was never proposed, which meant that States were never consulted. Adding the requirement to the Technical Instructions should not have been done without final input from the Legal Bureau. The input from the Legal Bureau at DGP/25 was a written statement after much discussion within that bureau (see paragraph 1.2 of the DGP/25 Report). Any amendment affecting the scope of Annex 18 would need to respect this. There was a suggestion that if the provisions in the Technical Instructions contradicted the provisions in Annex 18 they should be removed. The Secretary acknowledged that the provisions in the Technical Instructions did provide some States with legal authority to oversee all freight forwarders. She was therefore not suggesting simply removing the tables without ensuring appropriate measures were taken elsewhere.

3.5.4.1.6 While recognizing the Secretary's concerns with making a decision in haste, the proposer did not believe this was the case as the issue had been a topic of discussion for two years. He strongly believed the issue needed to be addressed in the short-term. Revisions to the training provisions which were intended for incorporation in the 2019-2020 Edition of the Technical Instructions would create a gap that could affect oversight capability of those States which did have legal authority over all freight forwarders. He would not support the adoption of these training provisions unless this gap was closed. Other panel members were of the same opinion. The proposer requested that a decision be made and that the ANC or Council provide direction with respect to States lacking legal authority. Accordingly, the working group was asked for a show of support. By a small majority, the amendment was agreed.

3.6 **Agenda Item 6: Other business**

3.6.1 **States demanding approval of operators for carriage of dangerous goods and dangerous goods training**

3.6.1.1 A panel member asked for an update on action taken with respect to discussions at DGP/25 concerning the practice of some States requiring operators to seek a separate approval from them to carry dangerous goods to or from that State, which normally involved a separate review and approval of the operator's dangerous goods training programme (see paragraph 7.2 of the DGP/25 Report). The Secretariat noted that discussions with the Flight Operations Panel (FLTOSP) Secretary had taken place and that the FLTOSP would be asked for input.

3.6.2 **Mail Safety (DGP-WG/17-WP/7)**

3.6.2.1 Concerns related to the continued discovery of lithium batteries in the mail were raised. It was noted that only twenty-six of the Universal Postal Union's (UPU) 190 member states had been listed on the UPU's website as being approved to accept lithium batteries contained in equipment in accordance with Part 1;2.3 of the Technical Instructions. It was noted that a search result for "lithium ion battery" on one e-commerce site returned 7,900 results with options for many of these to be delivered through mail, regardless of the location of the sender. The working group was invited to discuss whether designated postal operators (DPOs) had developed procedures for controlling the introduction of dangerous goods in mail into air transport and whether CAAs had approved these procedures in accordance with the new requirements incorporated in the 2013-2014 Edition of the Technical Instructions. They were also invited to discuss whether these procedures were subject to periodic review in any States and whether or not compliance with oversight of DPOs should be included in ICAO's safety oversight programme.

3.6.2.2 Concerns raised were shared by many panel members. Some stated that there were effective processes and procedures within their States, but dangerous goods from the State of Origin were often detected which suggested a lack of effective processes and procedures in other States. Although recognizing that including DPOs in ICAO's safety oversight programme could help improve compliance, many noted that this would not be legally possible. The approval of DPOs training programmes and procedures for the introduction of dangerous goods into the mail was a one-time process for most panel members, although this did result in improved communication with DPOs. An observer from the Universal Postal Union (UPU) wanted to make it clear that civil aviation administrations (CAAs) did not have legal authority over designated postal operators. Legal authority over DPOs could only come from within UPU regulations, and there were a number of legal entities involved. In this respect, any reference to CAA authority over DPOs within the Technical Instructions would only have any legal status if provided for in the postal regulations.

3.6.2.3 It was agreed that the ICAO/UPU Contact Committee (see paragraph 3.2.1.5.3) should be asked to add the concerns raised to their agenda.

3.6.3 **Presentations**

3.6.3.1 **Safety management (DGP-WG/17-IP/5)**

3.6.3.1.1 Ms. Elizabeth Gnehm, programme coordinator for ICAO's safety management programme, provided the working group with an overview of:

- a) amendments to Annex 19 (Amendment 1) and the *Safety Management Manual (SMM)* (Doc 9859);

- b) the safety management training programme;
- c) safety management assessment tools; and
- d) safety management regional symposia and workshops.

3.6.3.1.2 There was mutual agreement of the need for close coordination between the Safety Management Panel (SMP) and the DGP.

3.6.3.2 Remotely Piloted Aircraft Systems Considerations (DGP-WG/17-IP/6)

3.6.3.2.1 Ms. Leslie Cary, ICAO's programme manager for remotely piloted aircraft systems and secretary of the Remotely Piloted Aircraft Systems Panel (RPASP) provided background information on the programme and a brief description of plans to integrate dangerous goods provisions into RPAS provisions. The DGP would be asked to provide direction and/or input to RPASP for the development of provisions in a new Part IV to Annex 6 — *Operation of Aircraft* and Annex 8 — *Airworthiness of Aircraft*. She noted that the *Manual on Remotely Piloted Aircraft System* (RPAS) contained one small paragraph on dangerous goods that referred to Annex 18 and the Technical Instructions. The DGP was also being asked for contributions to a future edition of that manual.

3.6.3.2.2 The presentation prompted much discussion on the complexities of transporting dangerous goods and the various issues that would need to be addressed for transport by remotely piloted aircraft systems. There were several experts on the design and operation of aircraft on the RPASP, but no dangerous goods experts. Ms. Cary noted that a joint task force may need to be established to progress the work. There was mutual agreement of the need for close coordination between the RPASP and DGP.

3.6.3.3 Status of SAE G-27 Lithium Battery Packaging Performance Committee (DGP-WG/17-IP/7)

3.6.3.3.1 The co-chairmen of the SAE G-27 Lithium Battery Packaging Performance Committee presented an update on the status of the standard. A fourth draft standard was being informally reviewed by the G-27 committee. The goal was to send the final draft out for formal balloting by the end of the year. The working group was provided with an overview of content of this draft and outstanding/open issues. Although it was difficult to predict, an optimistic timeline was presented with an estimated completion of second quarter 2018. Coordinating with several different stakeholders and achieving consensus within a large group was a difficult process. Organizations with capabilities to conduct testing were encouraged to do so while the standard was being written for the purpose of validation.

3.6.3.4 Safe transport of medical devices containing lithium batteries (DGP-WG/17-IP/8)

3.6.3.4.1 A representative of the Medical Device Battery Transport Council provided an overview of efforts taken to facilitate the safe transport of life-saving and enhancing devices and spare batteries in a timely manner. He noted that the council was working with all parties to find and implement reasonable solutions to enhance air transport safety. He described collaborative efforts to develop a voluntary certification programme of known shippers and products called "Safe2Fly". He expressed the need for expeditious transport of spare batteries for life saving devices and the difficulties involved with the exemption process. He hoped that transport of bulk batteries for medical devices could be permitted through an approval process in the interest of public health.

3.6.3.5 Samsung Galaxy Note 7 recall, investigation, and technical safety measures put in place

3.6.3.5.1 A representative of Samsung provided an overview of the battery failures and fire incidents that lead to the world-wide recall of Samsung Note 7 notebooks, the success of the recall process, the investigation into the root causes, and the technical safety measures put in place for all phones going forward.

APPENDIX A

PROPOSED AMENDMENT TO ANNEX 18

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

CHAPTER 1. DEFINITIONS

DGP-WG/17-WP/26 (see paragraph 3.5.4 of this report):

...

Flight crew member. A licensed crew member charged with duties essential to the operation of an aircraft during a flight duty period.

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

...

CHAPTER 10. TRAINING PROGRAMMES

10.1 Establishment of training programmes

10.1.1 Initial and recurrent dangerous goods training programmes shall be established and maintained in accordance with the Technical Instructions 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 or mail;
- 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;
- g) agencies engaged in the security screening of passengers and crew and their baggage and/or cargo or mail; and
- h) designated postal operators.

10.1.2 In order to prevent the entry into air transport of dangerous goods as cargo or mail not prepared in accordance with the Standards and Recommended Practices of this Annex and the detailed provisions of the Technical Instructions, initial and recurrent dangerous goods training programmes shall be established and maintained by or on behalf of entities other than a), d) or e) above that do not process, handle or accept dangerous goods.

10.2 Approval of training programmes

10.2.1 Dangerous goods training programmes for operators shall be approved by the appropriate authority of the State of the Operator.

Note.— Dangerous goods training programmes are required for all operators regardless of whether or not they are approved to transport dangerous goods.

10.2.2 Dangerous goods training programmes for designated postal operators shall be approved by the civil aviation authority of the State where the mail is accepted by the designated postal operator.

10.2.3 **Recommendation.**— *Dangerous goods training programmes required for entities other than operators and designated postal operators should be approved as determined by the appropriate national authority.*

Note 1.— See 11.4 for dangerous goods by mail.

Note 2.— See 4.2.2 of Annex 6 — Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes for surveillance of operations by a foreign operator.

...

APPENDIX B

CONSOLIDATION OF AMENDMENTS TO THE TECHNICAL INSTRUCTIONS AGREED AT DGP-WG/16 AND DGP-WG/17

Part 1

GENERAL

...

Chapter 1

SCOPE AND APPLICABILITY

...

UN Model Regulations, Chapter 1.1, Note 1 (see ST/SG/AC.10/44/Add.1)

Note.— Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these Instructions, are published as a separate Manual (United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) (ST/SG/AC.10/11/Rev.6 [and Amend.1](#)), the contents of which are:

...

1.1 GENERAL APPLICABILITY

...

1.1.5 General exceptions

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

...

DGP-WG/17-WP/9 (see paragraph 3.2.1.1 of this report):

c) for dropping in connection with agricultural, horticultural, forestry, ~~avalanche control~~, ice jam control and landslide clearance or pollution control activities;

~~d)~~ [for dropping or triggering in connection with avalanche control activities;](#)

~~e)~~ to provide, during flight, or related to the flight, aid in connection with search and rescue operations;

~~f)~~ 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;

...

~~g)~~ 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).

+ *Note.— This exception is only applicable to the means of transport performing the transport operation.*

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

...

Chapter 2

LIMITATION OF DANGEROUS GOODS ON AIRCRAFT

...

2.3 TRANSPORT OF DANGEROUS GOODS BY POST

...

DGP-WG/16-WP/54 (see paragraph 3.2.1.6):

...

2.3.2 The following dangerous goods may be acceptable in mail for air carriage subject to the provisions of the appropriate national authorities concerned and these Instructions ~~which relate to such material:~~

...

DGP-WG/16-WP/54 (see paragraph 3.2.1.3):

2.3.3 The procedures of designated postal operators (DPOs) for controlling the introduction of dangerous goods in mail into air transport are subject to review and approval by the civil aviation authority of the State where the mail is accepted.

2.3.4 ~~Before a~~The designated postal operator DPO must have received specific approval from the civil aviation authority before the DPO can introduce the acceptance of lithium batteries as identified in 2.3.2 d) and e) ~~they must have received specific approval from the civil aviation authority.~~

...

Chapter 3

GENERAL INFORMATION

...

3.1 DEFINITIONS

...

UN Model Regulations, Chapter 1.2.1 (see ST/SG/AC.10/44/Add.1)

Animal material. Animal carcasses, animal body parts ~~or animal~~, foodstuffs or feedstuffs derived from animals.

...

UN Model Regulations, Chapter 1.2.1 (see ST/SG/AC.10/44/Add.1)

GHS. The ~~sixth~~ seventh revised edition of the *Globally Harmonized System of Classification and Labelling of Chemicals*, published by the United Nations as document ST/SG/AC.10/30/~~Rev.6~~ Rev.7.

...

UN Model Regulations, Chapter 1.2.1 (see ST/SG/AC.10/44/Add.1)

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/225/257 (Sales No. E.4416.VIII.1).

...

UN Model Regulations, Chapter 1.2.1 (see ST/SG/AC.10/44/Add.1)

Manual of Tests and Criteria. The sixth 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.6 and Amend.1).

...

The Model Regulations do not contain the following definition. The amendment proposed is in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Dangerous goods. Articles or substances which are capable of posing a ~~risk~~ hazard to health, safety, property or the environment and which are shown in the list of dangerous goods in these Instructions, or which are classified according to these Instructions.

...

The Model Regulations do not contain the following introductory note. The amendment proposed is in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

INTRODUCTORY NOTE

The successful application of regulations concerning the transport of dangerous goods and the achievement of their objectives are greatly dependent on the appreciation by all individuals concerned of the ~~risks~~ hazards involved and on a detailed understanding of the regulations. This can only be achieved by properly planned and maintained initial and recurrent training programmes in the transport of dangerous goods for all persons concerned.

Chapter 4

TRAINING

...

Chapter 5

DANGEROUS GOODS SECURITY

...

Note 2 below was added as a note under 1.4.3.2.1 of the Model Regulations. The provisions in 1.4.3.2.1 are not included in the Technical Instructions. The dedicated working group tasked with reviewing the amendments at DGP-WG/17 agreed that this was an appropriate place for it.

Note 1.— This Chapter addresses the security responsibilities of operators, shippers and others involved in the transport of dangerous goods aboard aircraft. It should be noted that Annex 17 — Security, provides comprehensive requirements for implementation of security measures by States to prevent unlawful interference with civil aviation or when such interference has been committed. In addition, the Aviation Security Manual (Doc 8973 — Restricted) provides procedures and guidance on aspects of aviation security and is intended to assist States in the implementation of their respective national civil aviation security programmes. The requirements in the Chapter are intended to supplement the requirements of Annex 17 and to implement measures to be taken to minimize theft or misuse of dangerous goods that may endanger persons or property. The provisions of this Chapter do not supersede requirements of Annex 17 or the Aviation Security Manual.

UN Model Regulations, Chapter 1.4.3.2.1 (see ST/SG/AC.10/44/Add.1)

Note 2.— In addition to the security provisions of these Instructions, appropriate national authorities may implement further security provisions for reasons other than safety of dangerous goods during transport. In order to not impede international and multimodal transport by different explosives security markings, it is recommended that such markings be formatted consistent with an internationally harmonized standard (e.g. European Union Commission Directive 2008/43/EC).

5.3 PROVISIONS FOR HIGH CONSEQUENCE DANGEROUS GOODS

5.3.1 Definition of high consequence dangerous goods

...

UN Model Regulations, Chapter 1.4.3.1.5 (see ST/SG/AC.10/44/Add.1)

5.3.1.5 When radioactive material possess subsidiary ~~risks~~ hazards of other classes or divisions, the criteria of Table 1-7 should also be taken into account (see also 1;6.5).

...

Chapter 6

GENERAL PROVISIONS CONCERNING RADIOACTIVE MATERIAL

...

6.1 SCOPE AND APPLICATION

Corrigendum 1 to UN Model Regulations, Chapter 1.5.1.1 (see ST/SG/AC.10/1/Rev.19/Corr.1)

ICAO translators and editors of versions other than English: There may be a need for additional amendments to 1;6.1.1 and 1;6.1.2 for the sake of alignment with 1.5.1.1 and 1.5.1.2 of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

6.1.1 These Instructions establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These Instructions are based on the IAEA *Regulations for the Safe Transport of Radioactive Material*, (2012 Edition), IAEA Safety Standards Series No. SSR-6, IAEA, Vienna (2012). Explanatory material can be found in *Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2012 Edition)*, Safety Standard Series No. TS-G-1.1 (Rev. 1) ~~SSG-26~~, IAEA, Vienna (2008~~2014~~). The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risk.

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

- a) containment of the radioactive contents;
- b) control of external radiation levels;
- c) prevention of criticality; and
- d) prevention of damage caused by heat.

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

UN Model Regulations, Chapter 1.5.5.1 (see ST/SG/AC.10/44/Add.1)

6.5 RADIOACTIVE MATERIAL POSSESSING OTHER DANGEROUS PROPERTIES

In addition to the radioactive and fissile properties, any subsidiary ~~risk~~ **hazard** of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, must also be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and transport, in order to be in compliance with all relevant provisions for dangerous goods of these Instructions.

...

Part 2

CLASSIFICATION OF DANGEROUS GOODS

...

INTRODUCTORY CHAPTER

Parts of this Chapter are affected by State Variations DE 5, NL 4; see Table A-1

1. RESPONSIBILITIES

1.1 Classification must be made by the appropriate national authority when so required or may otherwise be made by the shipper.

1.2 A shipper who has identified, on the basis of test data, that a substance listed by name in column 1 of the Dangerous Goods List in Part 3, Chapter 2, Table 3-1 meets classification criteria for a hazard class or division that is not identified in the list, may, with the approval of the appropriate national authority, consign the substance:

- a) under the most appropriate generic or not otherwise specified (n.o.s.) entry reflecting all hazards; or

UN Model Regulations, 2.0.0.2 (see ST/SG/AC.10/44/Add.1)

ICAO translators and editors of versions other than English: There may be a need for an additional amendment to 2;0.1.2 b) for the sake of alignment with 2.0.0.2 b) of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

- b) under the same UN number and name but with additional hazard communication information as appropriate to reflect the additional subsidiary-risk hazard(s) (documentation, label) provided that the primary hazard class remains unchanged and that any other transport conditions (e.g. limited quantity, packaging provisions) that would normally apply to substances possessing such a combination of hazards are the same as those applicable to the substance listed.

...

ICAO translators and editors of versions other than English: There may be a need for amendments to 2;0.2.1 for the sake of alignment with 2.0.1.1 of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

2. CLASSES, DIVISIONS, PACKING GROUPS — DEFINITIONS

2.1 Substances (including mixtures and solutions) and articles subject to these Instructions are assigned to one of nine classes according to the hazard or the most predominant of the hazards they present. Some of these classes are subdivided into divisions. These classes and divisions are:

Class 1: Explosives

- Division 1.1: Substances and articles which have a mass explosion hazard
- Division 1.2: Substances and articles which have a projection hazard but not a mass explosion hazard
- Division 1.3: Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard
- Division 1.4: Substances and articles which present no significant hazard
- Division 1.5: Very insensitive substances which have a mass explosion hazard
- Division 1.6: Extremely insensitive articles which do not have a mass explosion hazard

Class 2: Gases

- Division 2.1: Flammable gases
- Division 2.2: Non-flammable, non-toxic gases
- Division 2.3: Toxic gases

Class 3: Flammable liquids

Class 4: Flammable solids; substances liable to spontaneous combustion; substances which, on contact with water, emit flammable gases

Division 4.1: Flammable solids, self-reactive and related substances and solid desensitized explosives and polymerizing substances

Division 4.2: Substances liable to spontaneous combustion

Division 4.3: Substances which, in contact with water, emit flammable gases

Class 5: Oxidizing substances and organic peroxides

Division 5.1: Oxidizing substances

Division 5.2: Organic peroxides

Class 6: Toxic and infectious substances

Division 6.1: Toxic substances

Division 6.2: Infectious substances

Class 7: Radioactive material

Class 8: Corrosive substances

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

The numerical order of the classes and divisions is not that of the degree of danger.

...

ICAO translators and editor of versions other than English: There may be a need for amendments to 2.0.2.5 for the sake of alignment with 2.0.1.4 of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

2.5 Dangerous goods are determined to present one or more of the dangers represented by Classes 1 to 9 and divisions and, if applicable, the degree of danger on the basis of the requirements in Part 2, Chapters 1 to 9.

UN Model Regulations, 2.0.1.5 (see ST/SG/AC.10/44/Add.1)

2.6 Dangerous goods presenting a danger of a single class and division are assigned to that class and division and the degree of danger (packing group), if applicable, determined. When an article or substance is specifically listed by name in the Dangerous Goods List (Table 3-1), its class or division, its subsidiary-risk hazard(s) and, when applicable, its packing group are taken from this list.

UN Model Regulations, 2.0.1.6 (see ST/SG/AC.10/44/Add.1)

Paragraph 2.7 does not currently align with the associated paragraph in the 19th edition of the UN Model Regulations (2.0.1.6). DGP is invited to consider whether the amendments highlighted in yellow below should be made for the sake of alignment. The only change incorporated in the 20th edition of the Model Regulations is the replacement of “subsidiary risk” with “subsidiary hazard”.

2.7 Where a substance or article is not specifically listed by name in Table 3-1 and there are two or more hazards of Class 3, 4 or 8 or Division 5.1 or 6.1 associated with its air transport in that it meets the definition for two of those classes or divisions as shown in Part 2, Chapters 1 to 9, it must be classified in accordance with the precedence of hazards table (Table 2-1). Dangerous goods meeting the defining criteria of more than one hazard class or division and which are not listed by name in Table 3-1, are assigned to a class and division and subsidiary hazard(s) on the basis of the precedence of hazards in 4.

...

3. UN NUMBERS AND PROPER SHIPPING NAMES

ICAO translators and editors of versions other than English: There may be a need for amendment to 2.0.3.1 for the sake of alignment with 2.0.2.1 of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

3.1 Dangerous goods are assigned to UN numbers and proper shipping names according to their hazard classification and their composition.

UN Model Regulations, 2.0.2.2 (see ST/SG/AC.10/44/Add.1)

3.2 Dangerous goods commonly carried are listed in Table 3-1. Where an article or substance is specifically listed by name, it must be identified in transport by the proper shipping name in Table 3-1. Such substances may contain technical impurities (for example, those deriving from the production process) or additives for stability or other purposes that do not affect its classification. However, a substance listed by name containing technical impurities or additives for stability or other purposes affecting its classification must be considered a mixture or solution (see 3.5). For dangerous goods not specifically listed by name, "generic" or "not otherwise specified (n.o.s.)" entries are provided (see 3.8) to identify the article or substance in transport. The substances listed by name in column 1 of Table 3-1 must be transported according to their classification in the list or under the conditions specified in 1.2. Each entry in Table 3-1 is characterized by a UN number. Table 3-1 also contains relevant information for each entry, such as hazard class, subsidiary-risk hazard(s) (if any), packing group (where assigned), packing requirements, passenger and cargo aircraft requirements, etc. Entries in Table 3-1 are of the following four types:

...

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

- a) the mixture or solution is identified by name in Table 3-1 in which case this name must be applied; or
- b) the name and description of the substance named in Table 3-1 specifically indicates that it applies only to the pure substance; or

UN Model Regulations, (2.0.2.5 c) (see ST/SG/AC.10/44/Add.1)

- c) the hazard class or division, subsidiary-risk hazard(s), physical state or packing group of the solution or mixture is different from that of the substance named in Table 3-1; or
- d) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Table 3-1.

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

Note.— Although traces of substances may not need to be taken into account for classification purposes, those traces may affect the properties of the substance and do need to be taken into account when considering the compatibility requirements of 4.1.1.3.

3.6 For a solution or mixture when the hazard class, the physical state or the packing group is changed in comparison with the listed substance, the appropriate n.o.s. entry must be used including its packaging and labelling provisions.

3.7 A mixture or solution containing one or more substances identified by name in Table 3-1 or classified under an n.o.s. entry and one or more substances not subject to these Instructions is not subject to these Instructions if the hazard characteristics of the mixture or solution are such that they do not meet the criteria (including human experience criteria) for any class.

3.8 Substances or articles which are not specifically listed by name in Table 3-1 must be classified under a "generic" or "n.o.s." entry. The substance or article must be classified according to the class definitions and test criteria in this Part, and is then assigned the "generic" or "n.o.s." entry in Table 3-1 which most appropriately describes the article or substance.¹ This

means that a substance is to be assigned to an entry of type c), as defined in 3.2, only if it cannot be assigned to an entry of type b), and to an entry of type d) only if it cannot be assigned to an entry of type b) or c)¹.

UN Model Regulations, 2.0.2.9 (see ST/SG/AC.10/44/Add.1)

3.9 A mixture or solution meeting the classification criteria of these Instructions that is not identified by name in Table 3-1 and that is composed of two or more dangerous goods must be assigned to an entry that has the proper shipping name, description, hazard class or division, subsidiary-risk **hazard**(s) and packing group that most precisely describe the mixture or solution.

4. PRECEDENCE OF HAZARD CHARACTERISTICS

UN Model Regulations, 2.0.3.1 (see ST/SG/AC.10/44/Add.1)

4.1 The precedence of hazards table (Table 2-1) must be used to determine the class of a substance, mixture or solution having more than one-risk **hazard**, when it is not named in Table 3-1 **or to assign the appropriate entry for articles containing dangerous goods n.o.s (UN Nos. 3537 to 3548, see 6)**. For goods having multiple-risk **hazards**, which are not specifically listed by name in Table 3-1, the most stringent packing group denoted to the respective hazards of the goods takes precedence over other packing groups, irrespective of Table 2-1. The correct class or division to be used is shown at the point at which the column and row intersect in Table 2-1. The correct packing group to be used is also shown at the point at which the column and row intersect. The precedence of hazard characteristics of the following have not been dealt with in Table 2-1, as the primary characteristics always take precedence:

- a) substances and articles of Class 1;
- b) gases of Class 2;
- c) liquid desensitized explosives of Class 3;
- d) self-reactive substances and solid desensitized explosives of Division 4.1;
- e) pyrophoric substances of Division 4.2;
- f) substances of Division 5.2;
- g) substances of Division 6.1 with a Packing Group I inhalation toxicity. Except for substances or preparations meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC₅₀) in the range of Packing Group I, but toxicity through oral ingestion or dermal contact only in the range of Packing Group III or less, which must be allocated to Class 8;
- h) substances of Division 6.2; and
- i) material of Class 7.

UN Model Regulations, 2.0.3.2 (see ST/SG/AC.10/44/Add.1)

4.2 Apart from radioactive material in excepted packages (where the other hazardous properties take precedence), radioactive material having other hazardous properties must always be classified in Class 7 and the subsidiary-risk **hazard** must also be identified. For radioactive material in excepted packages, except for UN 3507, **Uranium hexafluoride, radioactive material, excepted package**, Special Provision A130 applies.

4.3 An article which, apart from its other hazards, also meets the criterion for a magnetized material, must be identified in accordance with the provisions of this section and in addition as a magnetized material.

¹. See also the "List of n.o.s. and generic proper shipping names" in Attachment 1, Chapter 2.

5. TRANSPORT OF SAMPLES

...

UN Model Regulations, 2.0.4.3 (see ST/SG/AC.10/44/Add.1)

5.4 Samples of energetic materials for testing purposes

5.4.1 Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the UN Manual of Tests and Criteria may be transported under UN 3224 (self-reactive solid type C) or UN 3223 (self-reactive liquid type C), as applicable, of Division 4.1 provided that:

- a) the samples do not contain any:
 - i) known explosives;
 - ii) substances showing explosive effects in testing;
 - iii) compounds designed with the view of producing a practical explosive or pyrotechnic effect; or
 - iv) components consisting of synthetic precursors of intentional explosives;
- b) for mixtures, complexes or salts of inorganic oxidizing substances of Division 5.1 with organic material(s), the concentration of the inorganic oxidizing substance is:
 - i) less than 15%, by mass, if assigned to Packing Group I (high hazard) or II (medium hazard); or
 - ii) less than 30%, by mass, if assigned to Packing Group III (low hazard);
- c) available data do not allow a more precise classification;
- d) the sample is not packed together with other goods; and
- e) the sample is packed in accordance with Packing Instruction 459.

UN Model Regulations, 2.0.5 (see ST/SG/AC.10/44/Add.1) and paragraph 3.2.2.1 of this report

6. TRANSPORT OF ARTICLES CONTAINING DANGEROUS GOODS N.O.S.

The dedicated working group tasked with reviewing the amendments at DGP-WG/17 proposed that these articles should be forbidden from transport by air under normal circumstances unless approval was granted by the State of Origin and the State of the Operator in accordance with Special Provision A2. An ad hoc group will develop provisions for inclusion in the DGP/26 working paper on UN harmonization (see paragraph 3.2.2.1.3 of this report).

The text in the new note is different to the text in the UN Model Regulations as highlighted below. UN text is as follows: "... only dangerous goods **within the permitted limited quantity amounts** specified in Column 7a of the Dangerous Goods List"

DGP is invited to consider whether or not reference to Special Provision A107, which corresponds to UN special provision 301 referred to in the latter part of the note in the Model Regulations ("... see UN No. 3363 and special provision 301 of Chapter 3.3") should be added. Not much of SP 301 is included in A107. Some of SP 301 is provided in Packing Instruction 962.

Note.— For articles which do not have an existing proper shipping name and which contain only dangerous goods permitted in limited quantities within the limits specified in Column 11 of Table 3-1, see UN No. 3363.

6.1 Articles containing dangerous goods may be transported as otherwise provided by these Instructions under the proper shipping name for the dangerous goods they contain or in accordance with this section. For the purposes of this section "article" means machinery, apparatus or other devices containing one or more dangerous goods (or residues

thereof) that are an integral element of the article, necessary for its functioning and that cannot be removed for the purpose of transport. An inner packaging must not be an article.

The ad hoc group developing provisions for inclusion in the DGP/26 working paper (see paragraph 3.2.2.1.3 of this report) will consider whether it is appropriate to include the following provisions for lithium batteries for the air mode, recognizing the potential for additional complexity and risk.

6.2 Such articles may in addition contain batteries. Lithium batteries that are integral to the article must be of a type proven to meet the testing requirements of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3, except when otherwise specified by these Instructions (e.g. for pre-production prototype articles containing lithium batteries or for a small production run, consisting of not more than 100 such articles).

6.3 This section does not apply to articles for which a more specific proper shipping name already exists in Table 3-1.

6.4 This section does not apply to dangerous goods of Class 1, Division 6.2, Class 7 or radioactive material contained in articles.

The ad hoc group developing provisions for inclusion in the DGP/26 working paper (see paragraph 3.2.2.1.3 of this report) will consider whether all other dangerous goods should be considered a higher hazard if lithium batteries are contained within the article.

6.5 Articles containing dangerous goods must be assigned to the appropriate class or division determined by the hazards present using, where applicable, Table 2-1 for each of the dangerous goods contained in the article. If dangerous goods classified as Class 9 are contained within the article, all other dangerous goods present in the article must be considered to present a higher hazard.

6.6 Subsidiary hazards must be representative of the primary hazard posed by the other dangerous goods contained within the article or they must be the subsidiary hazard(s) identified in column 4 of Table 3-1 when only one dangerous good is present in the article. If the article contains more than one dangerous good and these could react dangerously with one another during transport, each of the dangerous goods must be enclosed separately (see 4;1.1.8).

...

Table 2-1. Precedence of hazards and packing groups for Classes 3, 4 and 8 and for Divisions 5.1 and 6.1

...

The wording in the Model Regulations of the footnotes shown below is not the same as the wording in the Technical Instructions. The word “risk” is not used in the Model Regulations. Replacement of “risk” with “hazard” is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

DGP is also invited to consider the additional new text for the sake of alignment with the UN Model Regulations.

* Substances of Division 4.1 other than self-reactive substances, and solid desensitized explosives and substances of Class 3 other than liquid desensitized explosives.

** For pesticides only, the primary-risk hazard must be Division 6.1.

— Denotes an impossible combination.

Note.— For hazards not shown in this table, see 4.

Chapter 1

CLASS 1 — EXPLOSIVES

...

ICAO translators and editors of versions other than English: There may be a need for amendment to Note 4 2;1 for the sake of alignment with Note 4 at the beginning of Chapter 2.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

Note 4.— Class 1 is unique in that the type of packaging frequently has a decisive effect on the hazard and therefore on the assignment to a particular division. The correct division is determined by use of the procedures provided in this Chapter.

...

1.1 DEFINITIONS AND GENERAL PROVISIONS

Class 1 comprises:

ICAO translators and editors of versions other than English: There may be a need for amendment to 2;1.1 a) for the sake of alignment 2.1.1.1 (a) of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

- a) explosive substances (a substance that is not itself an explosive but which can form an explosive atmosphere of gas, vapour or dust is not included in Class 1), except those that are too dangerous to transport or those where the predominant hazard is appropriate to another class;
- b) explosive articles, except devices containing explosive substances in such quantity or of such a character that their inadvertent or accidental ignition or initiation during transport will not cause any effect external to the device either by projection, fire, smoke, heat or loud noise (see 1.5.2); and

UN Model Regulations, 2.1.1.1 c) (see ST/SG/AC.10/44/Add.1)

- c) substances and articles not mentioned under 1.1 a) and b), which are manufactured with a view to producing a practical, explosive or pyrotechnic effect.

...

1.3 DIVISIONS

ICAO translators and editors of versions other than English: There may be a need for amendments to 2;1.1.4 a) to f) for the sake of alignment 2.1.1.4 (a) to (f) of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

1.3.1 Class 1 is divided into six divisions:

- a) Division 1.1 — Substances and articles which have a mass explosion hazard (a mass explosion is one which affects almost the entire load virtually instantaneously).
- b) Division 1.2 — Substances and articles which have a projection hazard but not a mass explosion hazard.
- c) Division 1.3 — Substances and articles which have a fire hazard and either a minor blast hazard or a minor projection hazard or both, but not a mass explosion hazard.

This division comprises substances and articles which:

- i) give rise to considerable radiant heat, or
- ii) burn one after another, producing minor blast or projection effects or both.

- d) Division 1.4 — Substances and articles which present no significant hazard.

This division comprises substances and articles which present only a small hazard in the event of ignition or initiation during transport. The effects are largely confined to the package and no projection of fragments of appreciable size or range is to be expected. An external fire must not cause virtually instantaneous explosion of almost the entire contents of the package.

Note.— Substances and articles of this division are in Compatibility Group S if they are so packaged or designed that any hazardous effects arising from accidental functioning are confined within the package, unless the package has been degraded by fire, in which case all blast or projection effects are limited to the extent that they do not significantly hinder fire fighting or other emergency response efforts in the immediate vicinity of the package.

- e) Division 1.5 — Very insensitive substances which have a mass explosion hazard.

This division comprises substances which have a mass explosion hazard but are so insensitive that there is very little probability of initiation or of transition from burning to detonation under normal conditions of transport.

Note.— For the normal conditions of transport, see Notes 2 to 4 of the Introductory Notes to Part 4.

UN Model Regulations, 2.1.1.4 f) (see ST/SG/AC.10/44/Add.1)

- f) Division 1.6 — Extremely insensitive articles which do not have a mass explosion hazard.

This division comprises articles which predominantly contain extremely insensitive substances and which demonstrate a negligible probability of accidental initiation or propagation.

Note.— The ~~risk~~ hazard from articles of Division 1.6 is limited to the explosion of a single article.

...

ICAO translators and editors of versions other than English There may be a need for amendment to 2.1.4.1 for the sake of alignment 2.1.2.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

1.4 COMPATIBILITY GROUPS

1.4.1 Goods of Class 1 are assigned to one of six divisions, depending on the type of hazard they present (see 1.3.1), and to one of thirteen compatibility groups which identify the kinds of explosive substances and articles that are deemed to be compatible. Tables 2-2 and 2-3 show the scheme of classification into compatibility groups, the possible hazard divisions associated with each group, and the consequential classification codes.

UN Model Regulations (Part 1;4.2.1 provisions aren't included in the UN Model Regulations. Amendment is proposed for the sake of alignment with current reference.

1.4.2.1 Certain Division 1.4S explosives, identified by Special Provision A165 in Table 3-1, are subject to Test Series 6 (d) of Part I of the *UN Manual of Tests and Criteria* (see ST/SG/AC.10/11/Rev.6 [and Amend.1](#)) to demonstrate that any hazardous effects arising from functioning are confined within the package. Evidence of a hazardous effect outside the package includes:

- a) denting or perforation of the witness plate beneath the package;
- b) a flash or flame capable of igniting such as a sheet of 80 ± 3 g/m² paper at a distance of 25 cm from the package;
- c) disruption of the package causing projection of the explosives contents; or
- d) a projection which passes completely through the packaging (a projection or fragment retained or stuck in the wall of the packaging is considered as non-hazardous).

Editorial amendment.— Move paragraph 1.5 after Tables 2-2 and 2-3:

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.

...

UN Model Regulations, 2.1.2.1.1 (see ST/SG/AC.10/44/Add.1)

Table 2-2. Classification codes

<i>Description of substance or article to be classified</i>	<i>Compatibility group</i>	<i>Classification code</i>
...		
Explosive substance or article containing an explosive substance and presenting a special-risk hazard (e.g. due to water activation or presence of hypergolic liquids, phosphides or a pyrophoric substance) and needing isolation of each type	L	1.1L 1.2L 1.3L
...		

...

ICAO translators and editors of versions other than English There may be a need for amendment to the heading of Table 2-3 for the sake of alignment 2.1.2.1.2 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

Table 2-3. Scheme of classification of explosives, combination of hazard division with compatibility group

Hazard	Compatibility Group													A-S Σ
	A	B	C	D	E	F	G	H	J	K	L	N	S	
1.1	1.1A	1.1B	1.1C	1.1D	1.1E	1.1F	1.1G		1.1J		1.1L			9
1.2		1.2B	1.2C	1.2D	1.2E	1.2F	1.2G	1.2H	1.2J	1.2K	1.2L			10
1.3			1.3C			1.3F	1.3G	1.3H	1.3J	1.3K	1.3L			7
1.4		1.4B	1.4C	1.4D	1.4E	1.4F	1.4G						1.4S	7
1.5				1.5D										1
1.6												1.6N		1
1.1-1.6 Σ		3	4	4	3	4	4	2	3	2	3	1	1	35

...

Editorial amendment.— Paragraph 1.5 has been moved from before Table 2-2.

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.

...

UN Model Regulations, 2.1.3.1.2 c) (see ST/SG/AC.10/44/Add.1)

1.5.1.3 Except for substances that are listed by their proper shipping name in the Dangerous Goods List (Table 3-1), goods must not be offered for transport as Class 1 until they have been subjected to the classification procedure prescribed in this Chapter. In addition, the classification procedure must be undertaken before a new product is offered for transport. In this context, a new product is one which, in the opinion of the appropriate national authority, involves any of the following:

- a) a new explosive substance or a combination or a mixture of explosive substances which is considered to be significantly different from other combinations or mixtures already classified;
- b) a new design of article or an article containing a new explosive substance or a new combination or mixture of explosive substances;
- c) a new design of package for an explosive substance or article including a new type of inner packaging.

Note.— The importance of this can be overlooked unless it is realized that a relatively minor change in an inner or outer packaging can be critical and can convert a lesser-risk hazard into a mass explosion-risk hazard.

...

1.5.2 Exclusion from Class 1

1.5.2.1 The appropriate national authority may exclude an article or substance from Class 1 by virtue of test results and the Class 1 definition.

1.5.2.2 Where a substance provisionally accepted into Class 1 is excluded from Class 1 by performing Test Series 6 on a specific type and size of package, this substance, when meeting the classification criteria or definition for another class or division, should be listed in the Dangerous Goods List in that class or division with a special provision restricting it to the type and size of package tested.

UN Model Regulations, 2.1.3.6.3 (see ST/SG/AC.10/44/Add.1)

1.5.2.3 Where a substance is assigned to Class 1 but is diluted to be excluded from Class 1 by Test Series 6, this diluted substance (hereafter referred to as desensitized explosive) should be listed in the Dangerous Goods List with an indication of the highest concentration which excluded it from Class 1 (see 2;3.1.4 and 2;4.2.4) and if applicable, the concentration below which it is no longer deemed subject to these Instructions. New solid desensitized explosives subject to these Instructions should be listed in Division 4.1, and new liquid desensitized explosives should be listed in Class 3. When the desensitized explosive meets the criteria or definition for another class or division, the corresponding subsidiary-risk hazard(s) should be assigned to it.

1.5.2.4 An article may be excluded from Class 1 when three unpackaged articles, each individually activated by its own means of initiation or ignition or external means to function in the designed mode, meet the following test criteria:

- a) no external surface has a temperature of more than 65°C. A momentary spike in temperature up to 200°C is acceptable;
- b) no rupture or fragmentation of the external casing or movement of the article or detached parts thereof of more than one metre in any direction;

Note.— Where the integrity of the article may be affected in the event of an external fire, these criteria must be examined by a fire test, such as described in ISO 12097-3.

- c) no audible report exceeding 135 dB(C) peak at a distance of one metre;

- d) no flash or flame capable of igniting a material such as a sheet of 80 ± 10 g/m² paper in contact with the article; and
- e) no production of smoke, fumes or dust in such quantities that the visibility in a one cubic metre chamber equipped with appropriately sized blow out panels is reduced more than 50 per cent as measured by a calibrated light (lux) meter or radiometer located one metre from a constant light source located at the midpoint on opposite walls. The general guidance on optical density testing in ISO 5659-1 and the general guidance on the photometric system described in Section 7.5 in ISO 5659-2 may be used or similar optical density measurement methods designed to accomplish the same purpose may also be employed. A suitable hood cover surrounding the back and sides of the light meter must be used to minimize effects of scattered or leaking light not emitted directly from the source.

Note 1.— If during the tests addressing criteria a), b), c) and d), no smoke, or very little smoke is observed, the test described in e) may be waived.

UN Model Regulations, 2.1.3.6.4 (see ST/SG/AC.10/44/Add.1)

Note 2.— The appropriate national authority may require testing in packaged form if it is determined that, as packaged for transport, the article may pose a greater-risk hazard.

...

ICAO translators and editors of versions other than English: There may be a need for amendment to 2;1.5.3.4 f) for the sake of alignment 2.1.3.7.4 (f) of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

1.5.3 Classification documentation

...

1.5.3.4 Examples of the information that may be provided in the classification documents are as follows:

...

- f) the proper shipping name, UN number, class, hazard division and corresponding compatibility group of the explosives;

...

Chapter 2

CLASS 2 — GASES

...

ICAO translators and editors of versions other than English: There may be a need for amendment to 2;2.2.1 for the sake of alignment 2.2.2.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

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 2.5.1 a) 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 10156:2010). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority must be used.

DGP-WG/16-WP/54 (see paragraph 3.2.2.1):

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

...

- c) Division 2.3 — Toxic gases.

Gases which:

ICAO translators and editors of versions other than English: There may be a need for amendment to 2.2.2.1 c) i) for the sake of alignment 2.2.2.1 (c) (i) of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

- 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 LC₅₀ value equal to or less than 5 000 mL/m³ (ppm) when tested in accordance with 6.2.1.3.

UN Model Regulations, 2.2.2.1 (see ST/SG/AC.10/44/Add.1)

There appears to be an error in ST/SG/AC.10/44/Add.1 as it refers to the first sentence of 2.2.2.1 (c), but the word “risk” appears under 2.2.2.1 (c) (ii).

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

ICAO translators and editors of versions other than English: There may be a need for amendment to 2.2.3 for the sake of alignment 2.2.2 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

2.3 HAZARD PRECEDENCE

Gases and gas mixtures with hazards associated with more than one division take the following precedence:

- a) Division 2.3 takes precedence over all other divisions;
- b) Division 2.1 takes precedence over Division 2.2.

UN Model Regulations, 2.2.3 (c) (see ST/SG/AC.10/44/Add.1)

2.4 MIXTURES OF GASES

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

...

- c) A gas mixture has a subsidiary-risk **hazard** of corrosivity when the mixture is known by human experience to be destructive to the skin, eyes or mucous membranes or when the LC₅₀ value of the mixture's corrosive components is equal to or less than 5 000 mL/m³ (ppm) when the LC₅₀ value is calculated by the formula:

$$LC_{50} \text{ Corrosive (mixture)} = \frac{1}{\sum_{i=1}^n \frac{f_{ci}}{T_{ci}}}$$

...

The Model Regulations do not contain the following provisions. The amendments proposed is in accordance with the agreement by the UN Sub-Committee that the word "risk" was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word "hazard" (see ST/SG/AC.10/C.3/98).

2.5 AEROSOLS

2.5.1 For aerosols, the division of Class 2 and the subsidiary-risk **hazards** depend on the nature of the contents of the aerosol dispenser. The following provisions must apply:

- a) Division 2.1 applies if the contents include 85 per cent by mass or more flammable components and the chemical heat of combustion is 30 kJ/g or more;
- b) Division 2.2 applies if the content contains 1 per cent by mass or less flammable components and the heat of combustion is less than 20 kJ/g;
- c) otherwise the product must be classified as tested by the tests described in the UN *Manual of Tests and Criteria*, Part III, section 31. Extremely flammable and flammable aerosols must be classified in Division 2.1; non-flammable in Division 2.2;
- d) gases of Division 2.3 must not be used as a propellant in an aerosol dispenser;
- e) where the contents other than the propellant of aerosol dispensers to be ejected are classified as Division 6.1, Packing Groups II or III or Class 8, Packing Groups II or III, the aerosol must have a subsidiary-risk **hazard** of Division 6.1 or Class 8;
- f) aerosols with contents meeting the criteria of Packing Group I for toxicity or corrosivity are forbidden from transport.

2.5.2 Flammable components are flammable liquids, flammable solids or flammable gases and gas mixtures as defined in Notes 1 to 3 of subsections 31.1.3 of Part III of the UN *Manual of Tests and Criteria*. This designation does not cover pyrophoric, self-heating or water-reactive substances. The chemical heat of combustion must be determined by one of the following methods: ASTM D 240, ISO/FDIS 13943: 1999 (E/F) 86.1 to 86.3 or NFPA 30B.

...

Chapter 3

CLASS 3 — FLAMMABLE LIQUIDS

...

3.2 ASSIGNMENT OF PACKING GROUPS

UN Model Regulations, 2.3.2.1, 2.3.2.1.1 and 2.3.2.1.2 (see ST/SG/AC.10/44/Add.1) and DGP-WG/16-WP/54 (see paragraph 3.2.1.6)

DGP is invited to consider changes in addition to the ones shown in ST/SG/AC.10/44/Add.1 for the purpose of alignment with UN Model Regulations to determine if the lack of harmonization was intentional and if so, if the UN should be informed.

3.2.1 Table 2-4 should be used for the determination of the packing group of a liquid that presents a ~~risk~~ **hazard** due to flammability. For liquids whose only hazard is flammability, the packing group for the material is the packing group shown in Table 2-4. For a liquid possessing an additional hazard(s), the packing group, determined by using Table 2-4, and the packing group based on the severity of the additional hazard(s), must be considered. In such cases, the table of precedence of hazard characteristics appearing in Table 2-1 should be used to determine the correct classification of the liquid.

3.2.2 Viscous flammable liquids such as paints, enamels, lacquers, varnishes, adhesives and polishes having a flash point of less than 23°C may be assigned to Packing Group III in conformity with the procedures prescribed in Part III, subsection 32.3 of the UN *Manual of Tests and Criteria* provided that:

- a) the viscosity² and flash point are in accordance with Table 2-5;
- b) less than 3 per cent of the clear solvent layer separates in the solvent separation test;
- c) the mixture or any separated solvent does not meet the criteria for Division 6.1 or Class 8;
- d) the net quantity per package does not exceed 30 L for passenger aircraft or 100 L for cargo aircraft.

3.2.3 Substances classified as flammable liquids due to their being transported or offered for transport at elevated temperatures are included in Packing Group III.

...

². Viscosity determination: Where the substance concerned is non-Newtonian, or where a flow cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer must be used to determine the dynamic viscosity coefficient of the substance, at 23°C, at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.

Chapter 4

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

INTRODUCTORY NOTES

Note 1.— Where the term “water-reactive” is used in these Instructions, it refers to a substance which, in contact with water, emits flammable gas.

Note 2.— Because of the different properties exhibited by the dangerous goods within Divisions 4.1 and 4.2, it is impracticable to establish a single criterion for classification in either of these divisions. Tests and criteria for assignment to the three divisions of Class 4 are addressed in this chapter and in the UN Manual of Tests and Criteria, Part III, section 33.

UN Model Regulations, 2.4, Introductory notes (see ST/SG/AC.10/44/Add.1)

Note 3.— Since organometallic substances can be classified in Divisions 4.2 or 4.3 with additional subsidiary-risks hazards, depending on their properties, a specific classification flowchart for these substances is given in 2.4.5 of the UN Recommendations on the Transport of Dangerous Goods.

...

4.2.3 Division 4.1 — Self-reactive substances

...

UN Model Regulations, 2.4.2.3.2.2 (see ST/SG/AC.10/44/Add.1)

4.2.3.2.3 Self-reactive substances permitted for transport are listed in 4.2.3.2.4. For each permitted substance listed, the appropriate generic entry of the Dangerous Goods List (UN 3221 to 3240) is assigned, and appropriate subsidiary-risks hazard(s) and remarks providing relevant information are given. The generic entries specify:

- the self-reactive substance type (B to F);
- the physical state (i.e. liquid/solid); and
- when temperature control is required.

...

UN Model Regulations, 2.4.2.3.2.3 (see ST/SG/AC.10/44/Add.1)

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

<i>Self-reactive substance</i>	<i>Concentration (%)</i>	<i>Control temperature (°C)</i>	<i>Emergency temperature (°C)</i>	<i>UN generic entry</i>	<i>Notes</i>
...					
4-Nitrosophenol	100	+35	+40	3236	
Phosphorothioic acid, O-[(cyanophenyl methylene) azanyl] O,O-diethyl ester	82-91 (Z isomer)			3227	8
Self-reactive liquid, sample				3223	6
...					

UN Model Regulations, 2.4.2.3.2.3 Remarks 2 and 10 (see ST/SG/AC.10/44/Add.1)

NOTES:

1. Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2 (b) of the UN Recommendations.
2. "EXPLOSIVE" subsidiary-risk [hazard](#) label required and consequently forbidden for transport by air under any circumstance.
3. Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2 (c) of the UN Recommendations.
4. Azodicarbonamide formulations which fulfil the criteria of 2.4.2.3.3.2 (d) of the UN Recommendations.
5. With a compatible diluent having a boiling point of not less than 150°C.
6. See 4.2.3.2.6.
7. This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1-naphthol-5-sulphonic acid meeting the criteria of 2.4.2.3.3.2 d) of the UN Recommendations.
8. [This entry applies to the technical mixture in n-butanol within the specified concentration limits of the \(Z\) isomer.](#)

...

4.2.5 Division 4.1 — Polymerizing substances and mixtures (stabilized)**4.2.5.1 Definitions and properties**

4.2.5.1.1 Polymerizing substances are substances which, without stabilization, are liable to undergo a strongly exothermic reaction resulting in the formation of larger molecules or resulting in the formation of polymers under conditions normally encountered in transport. Such substances are considered to be polymerizing substances of Division 4.1 when:

- a) their self-accelerating polymerization temperature (SAPT) is 75°C or less under the conditions (with or without chemical stabilization as offered for transport) and in the packaging in which the substance or mixture is to be transported;
- b) they exhibit a heat of reaction of more than 300 J/g; and
- c) they do not meet any other criteria for inclusion in Classes 1 to 8.

4.2.5.1.2 A mixture meeting the criteria of a polymerizing substance must be classified as a polymerizing substance of Division 4.1.

UN Model Regulations, 2.4.2.5.2 (see ST/SG/AC.10/44/Add.1)

4.2.5.1.3 Polymerizing substances are subject to temperature control in transport if their self-accelerating polymerization temperature (SAPT) is 50 °C or less in the packaging in which the substance is to be transported.

Note.—Substances meeting the criteria of a polymerizing substance and also for inclusion in Classes 1 to 8 are subject to the requirements of Special Provision A209.

4.3 SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION (DIVISION 4.2)

4.3.1 Definitions and properties

4.3.1.1 Division 4.2 includes:

ICAO translators and editors of versions other than English: There may be a need for amendment to 2.4.3.1.1 a) for the sake of alignment 2.4.3.1.1 (a) of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

- a) pyrophoric substances: substances, including mixtures and solutions (liquid or solid), which even in small quantities ignite within 5 minutes of coming into contact with air. These substances are the most liable to spontaneous combustion and are called pyrophoric substances; and
- b) self-heating substances: other substances which in contact with air without energy supply are liable to self-heating. These substances will ignite only when in large amounts (kilograms) and after long periods of time (hours or days) and are called self-heating substances.

...

4.4 SUBSTANCES WHICH, IN CONTACT WITH WATER, EMIT FLAMMABLE GASES (DIVISION 4.3)

4.4.1 Definitions and properties

DGP-WG/16-WP/54 (see paragraph 3.2.2.3):

~~4.4.1.1 Division 4.3—Substances which, in contact with water, emit flammable gases.~~

~~4.4.1.2—Certain substances in contact with water emit flammable gases which can form explosive mixtures with air. Such mixtures are easily ignited by all ordinary sources of ignition, for example, naked lights, sparking handtools or unprotected lamps. The resulting blast wave and flames may endanger people and the environment. The test method referred to in 4.4.2 must be used to determine whether the reaction of a substance with water leads to the development of a dangerous amount of gases which may be flammable. It must not be applied to pyrophoric substances.~~

...

Chapter 5

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

...

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, procedures and criteria in 5.2.2, 5.2.3 and the UN *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 in which the dangerous goods were manufactured 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 3;2, reclassification of those substances in accordance with these criteria need only be undertaken when this is necessary for safety.

UN Model Regulations, 2.5.2.1.2 (see ST/SG/AC.10/44/Add.1)

5.2.1.2 By exception, solid ammonium nitrate based fertilizers must be classified in accordance with the procedure as set out in the UN Manual of Tests and Criteria, Part III, section 39.

DGP:

The following provision from the Model Regulations (2.5.2.1.2 of 19th revised edition) is not included in the Technical Instructions. The meeting is invited to consider whether it should be included as 2;5.2.1.3 as shown below.

5.2.1.3 For substances having other hazards, e.g. toxicity or corrosivity, the requirements of Part 2, Introductory Chapter must be met.

...

Paragraph 2;5.3.2.3 does not currently align with the associated paragraph in the 19th edition of the UN Model Regulations (2.5.3.2.3). The dedicated working group tasked with reviewing the amendments at DGP-WG/17 concluded that the text in the Technical Instructions should be maintained. The only change incorporated in the 20th edition of the Model Regulations was the replacement of “subsidiary risks” with “subsidiary hazards”. Not relevant to the Technical Instructions if the provisions staying misaligned.

5.3.2.3 Organic peroxides permitted for transport are listed in 5.3.2.4. For each permitted substance, Table 2-7 assigns the appropriate generic entry in the Dangerous Goods List (UN 3103 to 3120) and provides relevant information. The generic entries specify:

- a) organic peroxide type (B to F);
- b) physical state (liquid or solid); and
- c) temperature control, when required (see 5.3.3).

...

DGP is invited to consider editorial changes to paragraph 5.3.2.4 for the sake of clarity, removal of redundancy, and harmonization with the UN Model Regulations.

5.3.2.4 *List of currently assigned organic peroxides in packagings*

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

5.3.2.5 Table 2-7 provides a list of currently assigned organic peroxides in packagings. Classification of organic peroxides not listed in ~~5.3.2.4~~ Table 2-7 and assignment to a generic entry must be made by the appropriate authority of the State in which the dangerous goods were manufactured on the basis of a test report. Principles applying to the classification of such substances are provided in 2.5.3.3 of the UN Recommendations. The applicable classification procedures, test methods and criteria, and an example of a suitable test report, are given in the current edition of the UN *Manual of Tests and Criteria*, Part II. The statement of approval must contain the classification and the relevant transport conditions.

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:

- a) the available data indicate that the sample would be no more dangerous than organic peroxide type B;

- b) it is packed in a combination packaging consisting of a plastic IP.2 inner packaging with a capacity not exceeding 0.5 L or 0.5 kg which is placed in a wooden box (4C1), plywood box (4D) or fibreboard box (4G) with the maximum net quantity per package not exceeding 1 L or 1 kg; and
- c) the available data indicate that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and sufficiently high to prevent any dangerous phase separation.
- ...

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

UN Model Regulations 2.5.3.2.4 (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider whether the last column of Table 2-7 should be entitled “Subsidiary hazards and notes” for the sake of the alignment with the UN Model Regulations

<i>Organic peroxide</i>	<i>Concentration (per cent)</i>	<i>Diluent type A (per cent)</i>	<i>Diluent type B (per cent) (Note 1)</i>	<i>Inert solid (per cent)</i>	<i>Water (per cent)</i>	<i>Control tempera- ture (°C)</i>	<i>Emergency tempera- ture (°C)</i>	<i>UN generic entry</i>	<i>Notes^S <u>ub- sidiary hazards and notes</u></i>
...									
Di-(4-tert-butylcyclohexyl) peroxydicarbonate	≤100					+30	+35	3114	
<u>Di-(4-tert-butylcyclohexyl) peroxydicarbonate</u>	<u>≤42 as a paste</u>					<u>35</u>	<u>40</u>	<u>3116</u>	
Di-(4-tert-butylcyclohexyl) peroxydicarbonate	≤42 as a stable dispersion in water					+30	+35	3119	
...									
Diisobutyl peroxide	>32-52		≥48			-20	-10	FORBIDDEN	3
<u>Diisobutyl peroxide</u>	<u>≤42 as a stable dispersion in water</u>					<u>-20</u>	<u>-10</u>	<u>3119</u>	
Diisobutyl peroxide	≤32		≥68			-20	-10	3115	
nn ...									
Peroxy lauric acid	≤100					+35	+40	3118	
<u>1-Phenylethyl hydroperoxide</u>	<u>≤38</u>		<u>≥ 62</u>					<u>3109</u>	
Pinanyl hydroperoxide	>56-100							3105	13
...									

UN Model Regulations, 2.5.3.2.4 (see ST/SG/AC.10/44/Add.1)

Notes:

- Diluent type B may always be replaced by diluent type A. Boiling point diluent type B should be at least 60°C higher than the SADT of the organic peroxide.
- Available oxygen ≤4.7 per cent.

3. "EXPLOSIVE" subsidiary-risk **hazard** label required and consequently forbidden for transport by air under any circumstance.
4. Diluent may be replaced by Di-tert-butyl peroxide.
5. Available oxygen ≤9 per cent.
6. With ≤9 per cent hydrogen peroxide; available oxygen ≤10 per cent.
7. Only non-metallic packagings allowed.
8. Available oxygen >10 per cent and ≤10.7 per cent, with or without water.
9. Available oxygen ≤10 per cent, with or without water.
10. Available oxygen ≤8.2 per cent, with or without water.
11. See 5.3.2.6.
12. Not used.
13. "CORROSIVE" subsidiary-risk **hazard** label required (see Figure 5-24).
14. Peroxyacetic acid formulations which fulfil the criteria of 5.3.2.5.
15. Peroxyacetic acid formulations which fulfil the criteria of 5.3.2.5.
16. Peroxyacetic acid formulations which fulfil the criteria of 5.3.2.5.
17. Addition of water to this organic peroxide will decrease its thermal stability.
18. No "CORROSIVE" subsidiary-risk **hazard** label required for concentrations below 80 per cent.
19. Mixtures with hydrogen peroxide, water and acid(s).
20. With diluent type A, with or without water.
21. With ≥25 per cent diluent type A by mass, and in addition ethylbenzene.
22. With ≥19 per cent diluent type A by mass, and in addition methyl isobutyl ketone.
23. With <6 per cent di-tert-butyl peroxide.
24. With ≤8 per cent 1-isopropylhydroperoxy-4-isopropylhydroxybenzene.
25. Diluent type B with boiling point >110°C.
26. With <0.5 per cent hydroperoxides content.
27. For concentrations more than 56 per cent, "CORROSIVE" subsidiary-risk **hazard** label required (see Figure 5-24).
28. Available active oxygen ≤7.6 per cent in diluent type A having a 95 per cent boil-off point in the range of 200-260°C.
29. Not subject to the requirements of these Instructions for Division 5.2.
30. Diluent type B with boiling point >130°C.
31. Active oxygen ≤6.7 per cent.

Chapter 6

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

...

ICAO translators and editors of versions other than English: There may be a need for amendment to 2.6.2.2.1 for the sake of alignment with 2.6.2.2.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

UN Model Regulations, 2.6.2.2.1 (a) (b) and (c) (see ST/SG/AC.10/44/Add.1)

6.2.2 Assignment of packing groups

6.2.2.1 Substances of Division 6.1, including pesticides, are allocated among the three packing groups, according to the degree of their toxic hazards in transport as follows:

- a) Packing Group I — Substances and preparations presenting a very severe toxicity ~~risk~~ **hazard**;
- b) Packing Group II — Substances and preparations presenting a serious toxicity ~~risk~~ **hazard**;
- c) Packing Group III — Substances and preparations presenting a relatively low toxicity ~~risk~~ **hazard**.

...

Editorial amendment:

6.2.2.4.1 The grouping criteria for the oral and dermal routes as well as for inhalation of dusts and mists are as shown in Table 2-8.

Note. — Substances meeting the criteria of Class 8 and with an inhalation toxicity of dusts and mists (LC_{50}) leading to Packing Group I are only accepted for an allocation to Division 6.1 if the toxicity through oral ingestion or dermal contact is at least in the range of Packing Group I or II. Otherwise, an allocation to Class 8 is made when appropriate (see ~~8.2.3~~ [8.2.4](#)).

...

6.2.4 Classification of pesticides

UN Model Regulations, 2.6.4.1 (see ST/SG/AC.10/44/Add.1)

6.2.4.1 All active pesticide substances and their preparations for which the LC_{50} and/or LD_{50} values are known and which are classified in Division 6.1 must be classified under appropriate packing groups in accordance with the criteria given in 6.2.2. Substances and preparations which are characterized by subsidiary risks [hazards](#) must be classified according to the precedence of hazards table (Table 2-1) with the assignment of appropriate packing groups.

6.2.4.2 If the oral or dermal LD_{50} value for a pesticide preparation is not known, but the LD_{50} value of its active substance(s) is known, the LD_{50} value for the preparation may be obtained by applying the procedures in 6.2.3.

ICAO translators and editors of versions other than English: There may be a need for amendments to the note below for the sake of alignment with Special Provision 61 of the UN Model Regulations, (see [ST/SG/AC.10/44/Add.1](#))

Note.— LD_{50} toxicity data for a number of common pesticides may be obtained from the most current edition of the document The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification available from the International Programme on Chemical Safety, World Health Organization (WHO), 1211 Geneva 27, Switzerland. While that document may be used as a source of LD_{50} data for pesticides, its classification system should not be used for purposes of transport classification of, or assignment of packing groups to, pesticides which must be in accordance with these Instructions.

UN Model Regulations, 2.6.4.3 (see ST/SG/AC.10/44/Add.1)

6.2.4.3 The proper shipping name used in the transport of the pesticide must be selected on the basis of the active ingredient, of the physical state of the pesticide and any subsidiary risks [hazards](#) it may exhibit.

...

6.3 DIVISION 6.2 — INFECTIOUS SUBSTANCES

...

6.3.6 Infected animals

6.3.6.1 Infected live animals

Live animals must not be used to consign infectious substances unless such a substance cannot be consigned by any other means. A live animal that has been intentionally infected and is known or suspected to contain an infectious substance may only be transported by air under the terms and conditions of an approval granted by the appropriate national authorities of the States of Origin, Transit, Destination and Operator in accordance with the Supplement to these Instructions (Part S-1;2).

UN Model Regulations, 2.6.3.6.2 (see ST/SG/AC.10/44/Add.1)

6.3.6.2 ~~Infected animal material~~ Deleted

~~Animal material from animals intentionally infected for the purpose of propagating pathogens of Category A or which would be assigned to Category A in cultures only, must be assigned to UN 2814 or UN 2900, as appropriate. Animal material infected by pathogens of Category B other than those which would be assigned to Category A if they were in cultures must be assigned to UN 3373.~~

...

UN Model Regulations, Chapter 2.8 (see ST/SG/AC.10/44/Add.1)

Chapter 8

CLASS 8 — CORROSIVE SUBSTANCES

8.1 DEFINITION OF CLASS 8 AND GENERAL PROVISIONS

8.1.1 ~~Class 8 substances (Corrosive substances)~~ are substances which, by chemical action, will cause ~~severe irreversible~~ damage when in contact with living tissue to the skin or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport.

8.1.2 ~~For substances and mixtures that are corrosive to skin, general classification provisions are provided in 8.2. Skin corrosion refers to the production of irreversible damage to the skin, namely, visible necrosis through the epidermis and into the dermis occurring after exposure to a substance or mixture.~~

8.1.3 ~~Liquids and solids which may become liquid during transport, which are judged not to be skin corrosive, must still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 8.3.3 c) ii).~~

8.2 ASSIGNMENT OF PACKING GROUPS GENERAL CLASSIFICATION PROVISIONS

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

- a) Packing Group I: Very dangerous substances and ~~preparations~~ mixtures;
- b) Packing Group II : Substances and ~~preparations~~ mixtures presenting medium danger;
- c) Packing Group III: Substances and ~~preparations~~ mixtures presenting minor danger.

8.2.2 Allocation of substances in Class 8 listed in Table 3-1 to the packing groups ~~referred to in the Introductory Chapter to Part 2 in Class 8~~ has been made on the basis of experience, taking into account such additional factors as inhalation risk (see 8.2.4) and reactivity with water, including the formation of hazardous decomposition products.

8.2.3 ~~New substances, including and 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~~ irreversible damage of intact skin tissue in accordance with the criteria in 8.3. ~~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).~~ Alternatively, for mixtures, the criteria in 8.4 can be used.

~~8.2.3~~ 8.2.4 A substance or ~~preparation~~ mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC₅₀) in the range of Packing Group I, but toxicity through oral ingestion or dermal contact only in the range of Packing Group III or less, must be allocated to Class 8 (see Note under 6.2.2.4.1).

8.3 PACKING GROUP ASSIGNMENT FOR SUBSTANCES AND MIXTURES

8.3.1 Existing human and animal data, including information from single or repeated exposure, must be the first line of evaluation, as they give information directly relevant to effects on the skin.

~~8.2.4~~ 8.3.2 In assigning the packing group ~~to a substance~~ in accordance with ~~8.2.2~~ 8.2.3, account must be taken of human experience in instances of accidental exposure. In the absence of human experience, the packing group ~~ing~~ must be based on data obtained from experiments in accordance with OECD Guideline for the Testing of Chemicals No. 404, *Acute Dermal Irritation/Corrosion*, 2002 2015 or No. 435, *In Vitro Membrane Barrier Test Method for Skin Corrosion*, 2006 2015. A substance or mixture which is determined not to be corrosive in accordance with OECD Guideline for the Testing of

Chemicals No. 430, *In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER)*, 2004 2015 or No. 431, *In Vitro Skin Corrosion: Human Skin Model Test*, 2004 2015 may be considered not to be corrosive to skin for the purposes of these Instructions without further testing.

~~8.2.5~~ **8.3.3** Packing groups are assigned to corrosive substances in accordance with the following criteria (see Table 2-15):

- a) *Packing Group I* is assigned to substances that cause ~~full thickness destruction~~ irreversible damage of intact skin tissue within an observation period of up to 60 minutes starting after ~~an~~ the exposure time of 3 minutes or less.
- b) *Packing Group II* is assigned to substances that cause ~~full thickness destruction~~ irreversible damage of intact skin tissue within an observation period of up to 14 days starting after ~~an~~ the exposure time of more than 3 minutes but not more than 60 minutes.
- c) *Packing Group III* is assigned to substances that:
 - i) cause ~~full thickness destruction~~ irreversible damage of intact skin tissue within an observation period of up to 14 days starting after ~~an~~ the exposure time of more than 60 minutes but not more than 4 hours; or
 - ii) are judged not to cause ~~full thickness destruction~~ irreversible damage of intact skin tissue but which exhibit a corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55°C when tested on both materials. For the purposes of testing steel, type S235JR+CR (1.0037 resp. St 37-2), S275J2G3+CR (1.0144 resp. St 44-3), ISO 3574; or Unified Numbering System (UNS) G10200 or a similar type or SAE 1020, and for testing aluminium, non-clad types 7075-T6 or AZ5GU-T6, must be used. An acceptable test is prescribed in the UN *Manual of Tests and Criteria*, Part III, Section 37.

Note.— Where an initial test on either steel or aluminium indicates the substance being tested is corrosive, the follow up test on the other metal is not required.

Paragraph 8.3 of the 2017-2018 Edition is moved to 8.5

8.3 SUBSTANCES FORBIDDEN FOR TRANSPORT

~~Chemically unstable substances of Class 8 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end, particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.~~

Table 2-15. Summary of criteria for assigning packing groups to corrosive substances

<i>Packing group</i>	<i>Exposure time</i>	<i>Observation period</i>	<i>Effect</i>
	≤ 3 min	≤ 60 min	Full thickness destruction <u>Irreversible damage</u> of intact skin
II	> 3 min ≤ 1 h	≤ 14 d	Full thickness destruction <u>Irreversible damage</u> of intact skin
III	> 1 h ≤ 4 h	≤ 14 d	Full thickness destruction <u>Irreversible damage</u> of intact skin
III	—	—	Corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55°C when tested on both materials

8.4 Alternative packing group assignment methods for mixtures: Step-wise approach

8.4.1 General provisions

8.4.1.1 For mixtures, it is necessary to obtain or derive information that allows the criteria to be applied to the mixture for the purpose of classification and assignment of packing groups. The approach to classification and assignment of

packing groups is tiered, and is dependent upon the amount of information available for the mixture itself, for similar mixtures and/or for its ingredients. The flow chart of Figure 2-2 outlines the process to be followed.

Editorial difference from UN Model Regulations: First column, last row: “Skin corrosion data available” instead of “Available skin corrosion data” (consistent with first two rows)

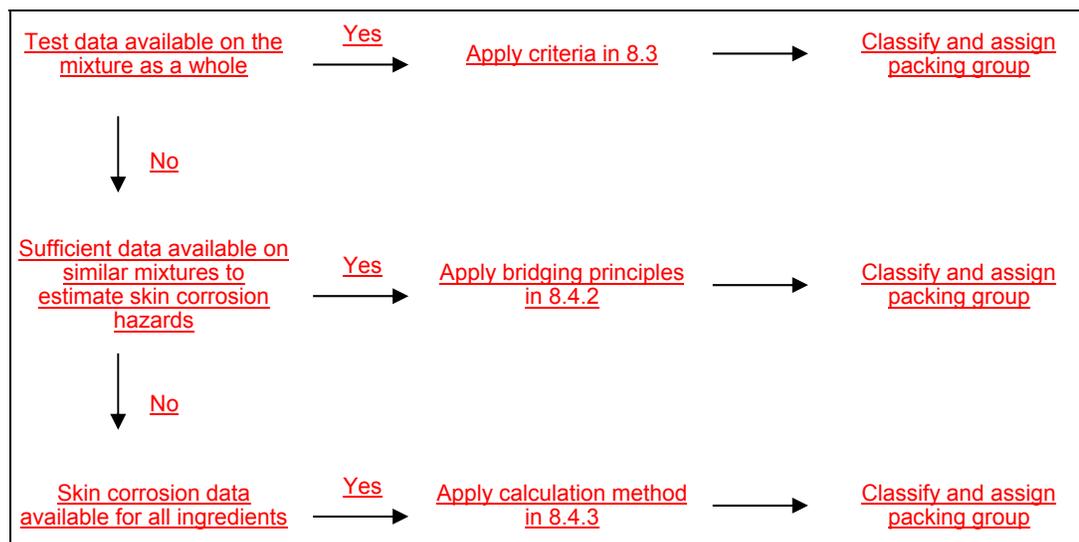


Figure 2-2 Step-wise approach to classify and assign packing group of corrosive mixtures

8.4.2 Bridging principles

8.4.2.1 Where a mixture has not been tested to determine its skin corrosion potential, but there are sufficient data on both the individual ingredients and similar tested mixtures to adequately classify and assign a packing group for the mixture, these data will be used in accordance with the following bridging principles. This ensures that the classification process uses the available data to the greatest extent possible in characterizing the hazards of the mixture.

- a) *Dilution.* If a tested mixture is diluted with a diluent which does not meet the criteria for Class 8 and does not affect the packing group of other ingredients, then the new diluted mixture may be assigned to the same packing group as the original tested mixture.

Note.— In certain cases, diluting a mixture or substance may lead to an increase in the corrosive properties. If this is the case, this bridging principle cannot be used.

- b) *Batching.* The skin corrosion potential of a tested production batch of a mixture can be assumed to be substantially equivalent to that of another untested production batch of the same commercial product when produced by or under the control of the same manufacturer, unless there is reason to believe there is significant variation such that the skin corrosion potential of the untested batch has changed. If the latter occurs, a new classification is necessary.

- c) *Concentration of mixtures of Packing Group I.* If a tested mixture meeting the criteria for inclusion in Packing Group I is concentrated, the more concentrated untested mixture may be assigned to Packing Group I without additional testing.

- d) *Interpolation within one packing group.* For three mixtures (A, B and C) with identical ingredients, where mixtures A and B have been tested and are in the same skin corrosion packing group, and where untested mixture C has the same Class 8 ingredients as mixtures A and B but has concentrations of Class 8 ingredients intermediate to the concentrations in mixtures A and B, then mixture C is assumed to be in the same skin corrosion packing group as A and B.

- e) *Substantially similar mixtures.* Given the following:

- i) two mixtures: (A+B) and (C+B);
- ii) the concentration of ingredient B is the same in both mixtures;

iii) the concentration of ingredient A in mixture (A+B) equals the concentration of ingredient C in mixture (C+B);

iv) data on skin corrosion for ingredients A and C are available and substantially equivalent, i.e. they are the same skin corrosion packing group and do not affect the skin corrosion potential of B;

if mixture (A+B) or (C+B) is already classified based on test data, then the other mixture may be assigned to the same packing group.

8.4.3 Calculation method based on the classification of the substances

8.4.3.1 Where a mixture has not been tested to determine its skin corrosion potential, nor is sufficient data available on similar mixtures, the corrosive properties of the substances in the mixture must be considered to classify and assign a packing group. Applying the calculation method is only allowed if there are no synergistic effects that make the mixture more corrosive than the sum of its substances. This restriction applies only if Packing Group II or III would be assigned to the mixture.

8.4.3.2 When using the calculation method, all Class 8 ingredients present at a concentration of ≥1 per cent must be taken into account, or <1 per cent if these ingredients are still relevant for classifying the mixture to be corrosive to skin.

8.4.3.3 To determine whether a mixture containing corrosive substances must be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 2-3 must be applied.

8.4.3.4 When a specific concentration limit (SCL) is assigned to a substance following its entry in Table 3-1 or in a special provision, this limit must be used instead of the generic concentration limits (GCL). This appears where 1 per cent is used in the first step for the assessment of the Packing Group I substances, and where 5 per cent is used for the other steps respectively in Figure 2-3.

8.4.3.5 For this purpose, the summation formula for each step of the calculation method must be adapted. This means that, where applicable, the generic concentration limit must be substituted by the specific concentration limit assigned to the substance(s) (SCL_i), and the adapted formula is a weighted average of the different concentration limits assigned to the different substances in the mixture:

$$\frac{PGx_1}{GCL} + \frac{PGx_2}{SCL_2} + \dots + \frac{PGx_i}{SCL_i} \geq 1$$

Where:

PG_x = concentration of substance 1, 2 ... i in the mixture, assigned to Packing Group x (I, II or III)

GCL = generic concentration limit

SCL_i = specific concentration limit assigned to substance i

The criterion for a packing group is fulfilled when the result of the calculation is ≥1. The generic concentration limits to be used for the evaluation in each step of the calculation method are those found in Figure 2-3.

Note.— Examples for the application of the above formula:

Example 1

A mixture contains one corrosive substance in a concentration of 5 per cent assigned to Packing Group I without a specific concentration limit:

Calculation for packing group I:

$$\frac{5}{5 \text{ (GCL)}} = 1 \rightarrow \text{assign to Class 8, Packing Group I:}$$

Example 2

A mixture contains three substances corrosive to skin; two of them (A and B) have specific concentration limits; for the third one (C) the generic concentration limits apply. The rest of the mixture needs not to be taken into consideration:

Editorial difference from UN Model Regulations: Second column, included “%” with values in lieu of specifying “in %” in header row (consistent with values in columns 3-6)

<u>Substance X in the mixture and its packing group assignment within Class 8</u>	<u>Concentration (conc) in the mixture</u>	<u>Specific concentration limit (SCL) for Packing Group I</u>	<u>Specific concentration limit (SCL) for Packing Group II</u>	<u>Specific concentration limit (SCL) for Packing Group III</u>
<u>A — assigned to Packing Group I</u>	<u>3%</u>	<u>30%</u>	<u>none</u>	<u>none</u>
<u>B — assigned to Packing Group I</u>	<u>2%</u>	<u>20%</u>	<u>10%</u>	<u>none</u>
<u>C — assigned to Packing Group III</u>	<u>10%</u>	<u>none</u>	<u>none</u>	<u>none</u>

Calculation for Packing Group I:

$$\frac{3 (\text{conc } A)}{30 (\text{SCL } PGI)} + \frac{2 (\text{conc } B)}{20 (\text{SCL } PGI)} = 0.2 < 1$$

The criterion for Packing Group I is not fulfilled.

Calculation for Packing Group II:

$$\frac{3 (\text{conc } A)}{5 (\text{GCL } PG II)} + \frac{2 (\text{conc } B)}{10 (\text{SCL } PG II)} = 0.8 < 1$$

The criterion for Packing Group II is not fulfilled.

Calculation for Packing Group III:

$$\frac{3 (\text{conc } A)}{5 (\text{GCL } PG III)} + \frac{2 (\text{conc } B)}{5 (\text{GCL } PG III)} + \frac{10 (\text{conc } C)}{5 (\text{GCL } PG III)} = 3 \geq 1$$

The criterion for Packing Group III is fulfilled, the mixture must be assigned to Class 8, Packing Group III.

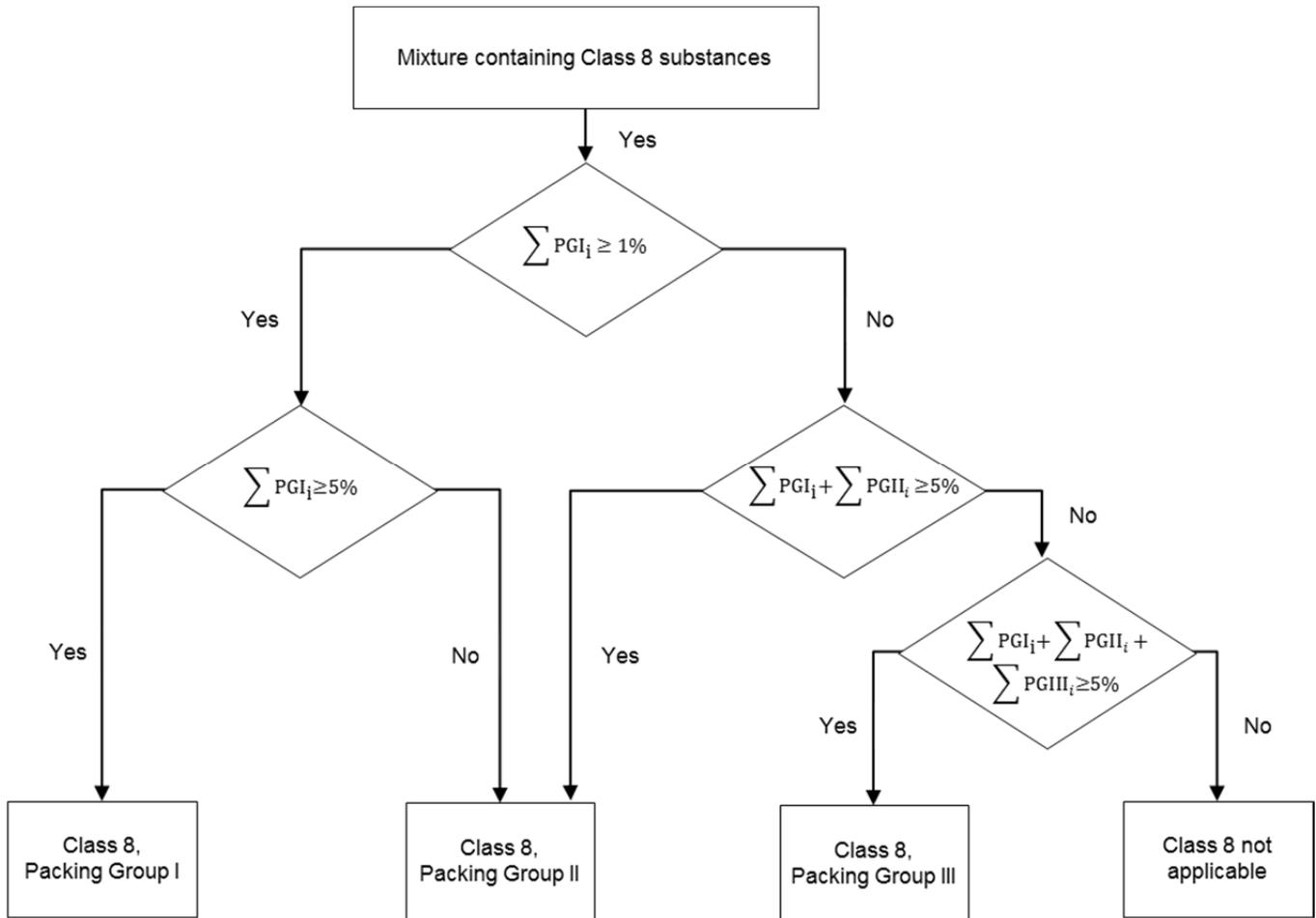


Figure 2-3. Calculation method

Paragraph 8.5 was moved from 8.3 of the 2017-2018 Edition (no changes).

8.5 SUBSTANCES FORBIDDEN FOR TRANSPORT

Chemically unstable substances of Class 8 are forbidden for transport unless the necessary precautions have been taken to prevent the possibility of a dangerous decomposition or polymerization under normal conditions of transport. For the precautions necessary to prevent polymerization, see Special Provision A209. To this end, particular care must be taken to ensure that receptacles do not contain any substances liable to promote these reactions.

Chapter 9

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

...

9.3 LITHIUM BATTERIES

9.3.1 Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form must be assigned to UN Nos. 3090, 3091, 3480 or 3481, as appropriate. They may be transported under these entries if they meet the following provisions:

- a) each cell or battery is of the type proved to meet the requirements of each test of the UN *Manual of Tests and Criteria*, Part III, subsection 38.3;

Cells and batteries manufactured according to a type meeting the requirements of subsection 38.3 of the UN *Manual of Tests and Criteria*, Revision 3, Amendment 1 or any subsequent revision and amendment applicable at the date of the type testing may continue to be transported, unless otherwise provided in these Instructions.

Cell and battery types only meeting the requirements of the UN Manual of Tests and Criteria, Revision 3, are no longer valid. However, cells and batteries manufactured in conformity with such types before 1 July 2003 may continue to be transported if all other applicable requirements are fulfilled.

Note.— Batteries must be of a type proved to meet the testing requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3, irrespective of whether the cells of which they are composed are of a tested type.

- b) each cell and battery incorporates a safety venting device or is designed to preclude a violent rupture under conditions normally incident to transport;
- c) each cell and battery is equipped with an effective means of preventing external short circuits;
- d) each battery containing cells or a series of cells connected in parallel is equipped with effective means as necessary to prevent dangerous reverse current flow (e.g. diodes, fuses, etc.);
- e) cells and batteries must be manufactured under a quality management programme that includes:
- 1) a description of the organizational structure and responsibilities of personnel with regard to design and product quality;
 - 2) the relevant inspection and test, quality control, quality assurance, and process operation instructions that will be used;
 - 3) process controls that should include relevant activities to prevent and detect internal short circuit failure during manufacture of cells;
 - 4) quality records, such as inspection reports, test data, calibration data and certificates. Test data must be kept and made available to the appropriate national authority upon request;
 - 5) management reviews to ensure the effective operation of the quality management programme;
 - 6) a process for control of documents and their revision;
 - 7) a means for control of cells or batteries that are not conforming to the type tested in accordance with Part III, subsection 38.3 of the UN *Manual of Tests and Criteria*;
 - 8) training programmes and qualification procedures for relevant personnel; ~~and~~
 - 9) procedures to ensure that there is no damage to the final product.;

Editorial amendment: Note should be aligned under sub-paragraph e) as shown here.

Note.— In-house quality management programmes may be accepted. Third-party certification is not required, but the procedures listed in 1) to 9) above must be properly recorded and traceable. A copy of the quality management programme must be made available to the appropriate national authority upon request.

UN Model Regulations, 2.9.4 (see ST/SG/AC.10/44/Add.1)

f) lithium batteries, containing both primary lithium metal cells and rechargeable lithium ion cells, that are not designed to be externally charged (see Special Provision A213) must meet the following conditions:

(i) the rechargeable lithium ion cells can only be charged from the primary lithium metal cells;

ii) overcharge of the rechargeable lithium ion cells is precluded by design;

iii) the battery has been tested as a lithium primary battery;

iv) component cells of the battery must be of a type proved to meet the respective testing requirements of the UN Manual of Tests and Criteria, Part III, subsection 38.3.; and

g) manufacturers and subsequent distributors of cells or batteries must make available the test summary as specified in the UN Manual of Tests and Criteria, Part III, subsection 38.3, paragraph 38.3.5.

...

Part 3

DANGEROUS GOODS LIST, SPECIAL PROVISIONS AND LIMITED AND EXCEPTED QUANTITIES

Chapter 1

GENERAL

...

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

...

ICAO translators and editors of versions other than English: There may be a need for amendment to 1.2.7.1.1 for the sake of alignment with 3.1.2.8.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

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

UN Model Regulations, 3.1.2.8.1.2 (see ST/SG/AC.10/44/Add.1)

1.2.7.1.2 When a mixture of dangerous goods ~~is~~ or articles containing dangerous goods are described by one of the “n.o.s.” or “generic” entries where an asterisk is indicated in column 1 of the Dangerous Goods List, not more than the two constituents which most predominantly contribute to the hazard or hazards of ~~a~~ the mixture or of the articles need to be shown, excluding controlled substances when their disclosure is prohibited by national law or international convention. If a package containing a mixture is labelled with any subsidiary ~~risk~~ hazard label, one of the two technical names as shown in parentheses must be the name of the constituent which compels the use of the subsidiary ~~risk~~ hazard label.

 UN Model Regulations, 3.1.2.8.1.3 (see ST/SG/AC.10/44/Add.1)

1.2.7.1.3 Examples illustrating the selection of the proper shipping name supplemented with the technical name of the dangerous goods for such n.o.s. entries are:

UN 3540	Articles containing flammable liquids n.o.s. (pyrrolidine)
UN 3394	Organometallic substance, liquid, pyrophoric, water-reactive (Trimethylgallium)
UN 2902	Pesticide, liquid, toxic, n.o.s. (Drazoxolon).

Note. — As an aid to choosing the most appropriate n.o.s. or generic name, all the n.o.s. entries and the main generic entries of Table 3-1 are listed in Attachment 1, Chapter 2.

...

1.3 MIXTURES OR SOLUTIONS

...

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

- a) the mixture or solution is specifically identified by name in Table 3-1 in which case this name must be applied; or
- b) the name and description of the substance named in Table 3-1 specifically indicates that it applies only to the pure substance; or

 UN Model Regulations, 3.1.3.2 (c) (see ST/SG/AC.10/44/Add.1)

- c) the hazard class or division, subsidiary-~~risk~~ hazard(s), physical state or packing group of the solution or mixture is different from that of the substance named in Table 3-1; or
- d) the hazard characteristics and properties of the mixture or solution necessitate emergency response measures that are different from those required for the substance identified by name in Table 3-1.

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

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

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 UN Model Regulations, 3.1.3.3 (see ST/SG/AC.10/44/Add.1)

1.3.4 A mixture or solution meeting the classification criteria of these Instructions that is not identified by name in Table 3-1 and that is composed of two or more dangerous goods must be assigned to an entry that has the proper shipping name, description, hazard class or division, subsidiary-~~risk~~ hazard(s) and packing group that most precisely describe the solution or mixture.

Chapter 2

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

...

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

UN Model Regulations, 3.2.1, description of Column 4 (see ST/SG/AC.10/44/Add.1)

Column 4 “Subsidiary-~~risk~~ hazard” — this column contains the class or division number of any important subsidiary-~~risks~~ hazards which have been identified by applying the classification found in Part 2; Chapters 1 to 9. Requirements for the labelling of dangerous goods which have subsidiary-~~risks~~ hazards are given in 5;3.2.

The Model Regulations do not contain a column for labels. The amendments proposed is in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Column 5 “Labels” — this column specifies the class hazard label followed by the subsidiary-~~risk~~ hazard label(s) (after the symbol “&”) to be applied to each outside packaging and overpack. Subsidiary-~~risk~~ hazard labels are not shown for all n.o.s. or generic articles and substances which possess more than one hazard. When such an article or substance has more than one hazard and no subsidiary-~~risk~~ hazard label is indicated in column 5 of Table 3-1, subsidiary-~~risk~~ hazard labels must be applied in accordance with 5;3.2.2 and 5;3.2.3. For magnetized material the required handling label is also shown. In the instances where no label is required the word “None” will appear.

...

Table 3-1. Dangerous Goods List

UN Model Regulations, Dangerous goods list (see ST/SG/AC.10/44/Add.1)

Name	UN No.	Class or division	Subsidiary risk <u>hazard</u>	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
								Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	6	7	8	9	10	11	12	13

See Appendix A for proposed amendments to Table 3-1

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Chapter 3

SPECIAL PROVISIONS

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Table 3-2. Special provisions

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UN Model Regulations, Special Provision 240 (see ST/SG/AC.10/44/Add.1)

A21 (~~≈240~~) ~~Not used.~~ This entry only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries which are transported with these batteries installed.

~~For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of vehicles are electrically powered cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with an electric motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft.~~

...

UN Model Regulations, Special Provision 251 (see ST/SG/AC.10/44/Add.1)

A44 (~~≈251~~) The entry chemical kit or first-aid kit is intended to apply to boxes, cases, etc., containing small quantities of various dangerous goods which are used, for example, for medical, analytical or testing or repair purposes. Components must not react dangerously (see 4;1.1.8). The packing group assigned to the kit as a whole must be the most stringent packing group assigned to any individual substance in the kit. The assigned packing group must be shown on the dangerous goods transport document. Where the kit contains only dangerous goods to which no packing group is assigned, a packing group must not be indicated on the dangerous goods transport document.

Table 3-3 (excepted quantities) refers to maximum quantity per inner packaging or maximum quantity per outer packaging. The UN table refers to maximum NET quantity per inner packaging or maximum NET quantity per out packing. DGP-WG/17 proposed that the text below should align with Table 3-3 ("quantity per inner packaging") and not the UN Model Regulations.

~~The only dangerous goods which are permitted in the kits are substances which may be transported as~~ Such kits must only contain dangerous goods that are permitted as:

- a) ~~excepted quantities~~ not exceeding the quantity indicated by the code ~~as specified in column 9 of Table 3-1, provided the inner packagings and quantities~~ that the quantity per inner packaging and quantity per package are as prescribed in 5.1.2 and 5.1.3 and the inner packagings are as prescribed in 5.2.4 a); or
- b) limited quantities as prescribed under 3;4.1.2.

...

DGP-WG/16-WP/54 (see paragraph 3.2.3.2):

A59 A tire assembly unserviceable or damaged is not subject to these Instructions if the tire is ~~completely~~ deflated to a gauge pressure of less than 200 kPa at 20°C. A tire assembly with a serviceable tire is not subject to these Instructions provided the tire is not inflated to a gauge pressure exceeding the maximum rated pressure for that tire. However, such tires (including valve assemblies) must be protected from damage during transport, which may require the use of a protective cover.

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DGP-WG/16-WP/54 (see paragraph 3.2.1.6):

A72 (163) A substance specifically listed by name in Table 3-1 must not be transported under this entry. ~~Materials~~ Substances transported under this entry may contain 20 per cent or less nitrocellulose provided the nitrocellulose contains not more than 12.6 per cent nitrogen.

...

UN Model Regulations, Special Provision 172 (see ST/SG/AC.10/44/Add.1)

A78 (≈172) Where a radioactive material has a subsidiary ~~risk~~ hazard(s):

- a) The substance must be allocated to Packing Group I, II or III, if appropriate, by application of the packing group criteria provided in Part 2 corresponding to the nature of the predominant subsidiary ~~risk~~ hazard.
- b) Packages must be labelled with subsidiary ~~risk~~ hazard labels corresponding to each subsidiary ~~risk~~ hazard exhibited by the material in accordance with the relevant provisions of 5;3.2; corresponding placards must be affixed to cargo transport units in accordance with the relevant provisions of 5;3.6.
- c) For the purposes of documentation and package marking, the proper shipping name must be supplemented with the name of the constituents which most predominantly contribute to this subsidiary ~~risk~~ hazard(s) and which must be enclosed in parenthesis.
- d) The dangerous goods transport document must indicate the subsidiary class or division and, where assigned, the packing group as required by 5;4.1.4.1 d) and e).

For packing, see also 4;9.1.5.

Radioactive material with a subsidiary ~~risk~~ hazard of Division 4.2 (Packing Group I) must be transported in Type B packages. Radioactive material with a subsidiary ~~risk~~ hazard of Division 2.1 is forbidden from transport on passenger aircraft, and radioactive material with a subsidiary ~~risk~~ hazard of Division 2.3 is forbidden from transport on passenger or cargo aircraft except with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the conditions established by those authorities. A copy of the document of approval, showing the quantity limitations and the packaging requirements, must accompany the consignment.

...

UN Model Regulations, Special Provision 307 (see ST/SG/AC.10/44/Add.1)

A79 (307) This entry may only be used for ~~uniform mixtures containing ammonium nitrate~~ fertilizers. They must be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39, as the main ingredient within the following composition limits:

- a) ~~not less than 90 per cent ammonium nitrate with not more than 0.2 per cent total combustible/organic material calculated as carbon and with added matter, if any, which is inorganic and inert towards ammonium nitrate; or~~
- b) ~~less than 90 per cent but more than 70 per cent ammonium nitrate with other inorganic materials or more than 80 per cent but less than 90 per cent ammonium nitrate mixed with calcium carbonate and/or dolomite and/or mineral calcium sulphate and not more than 0.4 per cent total combustible/organic material calculated as carbon; or~~

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~~e) nitrogen type ammonium nitrate based fertilizers containing mixtures of ammonium nitrate and ammonium sulphate with more than 45 per cent but less than 70 per cent ammonium nitrate and not more than 0.4 per cent total combustible/organic material calculated as carbon such that the sum of the percentage composition of ammonium nitrate and ammonium sulphate exceeds 70 per cent.~~

...

 UN Model Regulations, Special Provision 310 (see ST/SG/AC.10/44/Add.1)

A88 Pre-production prototypes of lithium batteries or cells, when these prototypes are transported for testing, or low production runs (i.e. annual production runs consisting of not more than 100 lithium batteries ~~and or~~ cells) of lithium batteries or cells that have not been tested to the requirements in Part III, 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 requirements in Packing Instruction 910 of the Supplement are met.

...

 UN Model Regulations, Special Provision 186 (see ST/SG/AC.10/44/Add.1)

A89 (186) ~~In determining the ammonium nitrate content, all nitrate ions for which a molecular equivalent of ammonium ions is present in the mixture must be calculated as ammonium nitrate.~~ **Not used.**

 UN Model Regulations, Special Provision 193 (see ST/SG/AC.10/44/Add.1)

A90 (193) This entry may only be used for ~~uniform~~ ammonium nitrate based **compound** fertilizers ~~mixtures of the nitrogen, phosphate or potash type, containing not more than 70 per cent ammonium nitrate and not more than 0.4 per cent total combustible/organic material calculated as carbon or with not more than 45 per cent ammonium nitrate and unrestricted combustible material. Fertilizers within these composition limits are not subject to these Instructions if shown by a Trough Test (see UN *Manual of Tests and Criteria*, Part III, subsection 38.2) not to be liable to self-sustaining decomposition. They must be classified in accordance with the procedure as set out in the UN *Manual of Tests and Criteria*, Part III, Section 39.~~

...

ICAO translators and editors of versions other than English: There may be a need for amendment to A92 for the sake of alignment with Special Provision 199 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

A92 (199) Lead compounds which, when mixed in a ratio of 1:1000 with 0.07 M hydrochloric acid and stirred for 1 hour at a temperature of 23°C ±2°C, exhibit a solubility of 5 per cent or less (see ISO 3711:1990 "*Lead chromate pigments and lead chromate-molybdate pigments — Specifications and methods of test*") are considered insoluble and are not subject to these Instructions unless they meet the criteria for inclusion in another hazard class or division.

...

A106 This entry may only be used for samples of chemicals taken for analysis in connection with the implementation of the Chemical Weapons Convention.

They may be transported on a passenger or cargo aircraft providing prior approval has been granted by the appropriate authority of the State of Origin or the Director General of the Organization for the Prohibition of Chemical Weapons and providing the samples comply with the requirements shown against the entry for chemical samples in Table S-3-1 of the Supplement.

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...

The Model Regulations do not contain the following provision (in SP 250). The amendment proposed is in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

The substance is assumed to meet the criteria of Packing Group I for Division 6.1. Subsidiary-~~risk~~ **hazard** labelling is not required.

A copy of the document of approval showing the quantity limitations and the packing requirements must accompany the consignment.

Note.— The transport of substances under this description must be in accordance with chain of custody and security procedures specified by the Organization for the Prohibition of Chemical Weapons.

...

The Model Regulations do not contain the following provision (in SP 250). The amendment proposed is in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

A112 Consumer commodities may only include substances of Class 2 (non-toxic aerosols only), Class 3, Packing Group II or III, Division 6.1 (Packing Group III only), UN 3077, UN 3082, UN 3175, UN 3334 and UN 3335 provided such substances do not have a subsidiary-~~risk~~ **hazard**. Dangerous goods that are forbidden for transport aboard passenger aircraft must not be transported as consumer commodities.

...

ICAO translators and editors of versions other than English: There may be a need for amendment to A115 for the sake of alignment with Special Provision 280 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

A115 (280) This entry applies to safety devices for vehicles, vessels or aircraft, e.g. air bag inflators, air bag modules, seat belt pretensioners, and pyromechanical devices and which contain dangerous goods of Class 1 or dangerous goods of other classes and when transported as component parts and if these articles as presented for transport have been tested in accordance with test series 6 (c) of Part I of the UN *Manual of Tests and Criteria*, with no explosion of the device, no fragmentation of the device casing or pressure receptacle, and no projection hazard or thermal effect which would significantly hinder firefighting or other emergency response efforts in the immediate vicinity.

This entry does not apply to life saving appliances described in Packing Instruction 955 (UN Nos. 2990 and 3072).

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UN Model Regulations, Chapter 3.3, Special Provision 293 (see ST/SG/AC.10/44/Add.1)

There may be an error in ST/SG/AC.10/44/Add.1 — says to insert “matches that” after “Safety matches are”, but doesn’t make sense with “that can be ignited”. DGP-WG/17 proposed following text:

A125 (293) The following definitions apply to matches:

- a) Fusee matches are matches the heads of which are prepared with a friction-sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat;
- b) Safety matches are matches combined with or attached to the box, book or card ~~that~~ which can be ignited by friction only on a prepared surface;
- c) Strike anywhere matches are matches that can be ignited by friction on a solid surface;
- d) Wax Vesta matches are matches that can be ignited by friction either on a prepared surface or on a solid surface.

...

UN Model Regulations, Chapter 3.3, Special Provision 290 (see ST/SG/AC.10/44/Add.1)

There may be an error in ST/SG/AC.10/44/Add.1 — refers to replacing “risk” by “hazard” in (a) and (b), but there is no reference to “risk” in (a).

A130 (290) When this radioactive material meets the definitions and criteria of other classes or divisions as defined in Part 2, it must be classified in accordance with the following:

- a) Where the substance meets the criteria for dangerous goods in excepted quantities as set out in 3;5, the packagings must be in accordance with 3;5.2 and meet the testing requirements of 3;5.3. All other requirements applicable to radioactive material, excepted packages as set out in 1;6.1.5 apply without reference to the other class or division;
- b) Where the quantity exceeds the limits specified in 3;5.1.2, the substance must be classified in accordance with the predominant subsidiary ~~risk~~ hazard. The dangerous goods transport document must describe the substance with the proper shipping name and UN number applicable to the other class supplemented with the name applicable to the radioactive excepted package according to column 1 of the Dangerous Goods List, and must be transported in accordance with the provisions applicable to that UN number. An example of the information shown on the dangerous goods transport document is:

UN 1993 Flammable liquid, n.o.s. (ethanol and toluene mixture), Radioactive material, excepted package — limited quantity of material, Class 3, PG II

The radioactive material, excepted package label (Figure 5-33) is not required on packages meeting the conditions set out in this sub-paragraph. To aid acceptance, it is recommended that “A130” be indicated on the dangerous goods transport document. In addition, the requirements of 2;7.2.4.1.1 apply;
- c) The provisions of 3;4 for the transport of dangerous goods packed in limited quantities do not apply to substances classified in accordance with sub-paragraph b);
- d) When the substance meets a special provision that excepts this substance from all dangerous goods provisions of the other classes, it must be classified in accordance with the applicable UN number of Class 7 and all requirements specified in 1;6.1.5 apply.

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UN Model Regulations, Special Provision 204 (see ST/SG/AC.10/44/Add.1)

A132 (204) Articles containing smoke-producing substance(s) corrosive according to the criteria for Class 8 must be labelled with a "Corrosive" subsidiary-risk hazard label. Articles containing smoke-producing substance(s) toxic by inhalation according to the criteria for Division 6.1 must be labelled with a "TOXIC" subsidiary-risk hazard label (Figure 5-18), except that those manufactured before 31 December 2016 may be offered for transport until 31 December 2018 without a "TOXIC" subsidiary label.

...

UN Model Regulations, Special Provision 312 (see ST/SG/AC.10/44/Add.1)

A134 (312) ~~Vehicles powered by a fuel cell engine must be consigned under the entries UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.~~ Not used.

...

The Model Regulations do not contain the following provision. The amendment proposed is in accordance with the agreement by the UN Sub-Committee that the word "risk" was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word "hazard" (see ST/SG/AC.10/C.3/98).

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

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ICAO translators and editor of versions other than English: There may be a need for amendments to A162 for the sake of alignment with Special Provision 339 b) of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

A162 (339) Fuel cell cartridges containing hydrogen in a metal hydride transported under this entry must have a water capacity less than or equal to 120 mL.

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

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

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

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ICAO translators and editor of versions other than English: There may be a need for amendments to A162 for the sake of alignment with Special Provision 361 b) of the UN Model Regulations, (see ST/SG/AC.10/44/Add.1)

A186 (361) This entry applies to electric double layer capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to these Instructions. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. All capacitors to which this entry applies, including capacitors containing an electrolyte that does not meet the classification criteria of any class or division of dangerous goods, must meet the following conditions:

- a) capacitors not installed in equipment must be transported in an uncharged state. Capacitors installed in equipment must be transported either in an uncharged state or protected against a short circuit;
- b) each capacitor must be protected against a potential short circuit hazard in transport as follows:

...

...

UN Model Regulations, Special Provision 362 (see ST/SG/AC.10/44/Add.1)

A187 (362) This entry applies to liquids, pastes or powders, pressurized with a propellant which meets the definition of a gas in 2;2.1.1 and 2;2.1.2 a) or b).

Note.— A chemical under pressure in an aerosol dispenser must be transported under UN 1950.

The following provisions must apply:

- a) The chemical under pressure must be classified based on the hazard characteristics of the components in the different states:
 - i) the propellant;
 - ii) the liquid; or
 - iii) the solid.

If one of these components, which can be a pure substance or a mixture, needs to be classified as flammable, the chemical under pressure must be classified as flammable in Division 2.1. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

- i) a flammable liquid is a liquid having a flashpoint of not more than 93°C;
- ii) a flammable solid is a solid which meets the criteria in 2;4.2.2 of these Instructions;
- iii) a flammable gas is a gas which meets the criteria in 2;2.2.1 of these Instructions;

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- b) gases of Division 2.3 and gases with a subsidiary ~~risk~~ **hazard** of 5.1 must not be used as a propellant in a chemical under pressure;
- c) where the liquid or solid components are classified as dangerous goods of Division 6.1, Packing Groups II or III, or Class 8, Packing Groups II or III, the chemical under pressure must be assigned a subsidiary ~~risk~~ **hazard** of Division 6.1 or Class 8 and the appropriate UN number must be assigned. Components classified in Division 6.1, Packing Group I, or Class 8, Packing Group I, must not be used for transport under this proper shipping name;
- d) in addition, chemicals under pressure with components meeting the properties of: Class 1, explosives; Class 3, liquid desensitized explosives; Division 4.1, self-reactive substances and solid desensitized explosives; Division 4.2, substances liable to spontaneous combustion; Division 4.3, substances which, in contact with water, emit flammable gases; Division 5.1, oxidizing substances; Division 5.2, organic peroxides; Division 6.2, infectious substances; or Class 7, radioactive material, must not be used for transport under this proper shipping name;
- e) Chemicals under pressure containing components forbidden for transport on both passenger and cargo aircraft (columns 10 to 13 of Table 3-1) must not be transported by air.

...

The Model Regulations do not contain the following provision. The amendment proposed is in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

A191 Notwithstanding the Division 6.1 subsidiary ~~risk~~ **hazard** shown in column 4 of Table 3-1, the toxic subsidiary ~~risk~~ **hazard** label and an indication of this subsidiary ~~risk~~ **hazard** on the dangerous goods transport document are not required when the manufactured articles contain not more than 5 kg of mercury. Transport in accordance with this special provision must be noted on the dangerous goods transport document.

...

UN Model Regulations, Special Provision 369 (see ST/SG/AC.10/44/Add.1) and Corrigendum 1 to UN Model Regulations, Chapter 3.3, special provision 369 (see ST/SG/AC.10/1/Rev.19/Corr.1)

DGP-WG/17 questioned why “radioactive material” was changed to “radioactivity”. The Secretary would raise the issue at the UN Sub-Committee.

A194 (369) In accordance with Part 2, Introductory Chapter, paragraph 4, this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Division 6.1 with ~~radioactive material~~ **radioactivity** and corrosive subsidiary ~~risks~~ **hazards**.

Uranium hexafluoride may be classified under this entry only if the conditions of 2;7.2.4.1.1.2, 2;7.2.4.1.1.5, 2;7.2.4.5.2 and, for fissile-excepted material, of 2;7.2.3.6 are met.

In addition to the provisions applicable to the transport of Division 6.1 substances with a corrosive subsidiary ~~risk~~ **hazard**, the provisions of 5;1.2.2.2, 5;1.6.3, 7;1.6 and 7;3.2.1 to 7;3.2.4 apply.

No Class 7 label is required to be displayed.

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UN Model Regulations, Special Provision 380 (see ST/SG/AC.10/44/Add.1)

A203 (380) ~~If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be assigned to UN 3166 — **Vehicle, flammable gas powered.**~~ **Not used.**

...

UN Model Regulations, Special Provision 385 (see ST/SG/AC.10/44/Add.1)

A207 (≈385) **Not used.** ~~This entry applies to vehicles powered by flammable liquid or gas internal combustion engines or fuel cells.~~

~~Hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the batteries installed must be consigned under this entry. Vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the batteries installed, must be consigned under the entry UN 3171 — **Battery-powered vehicle** (see Special Provision A21).~~

~~For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, trucks, locomotives, scooters, three- and four-wheeled vehicles or motorcycles, lawn tractors, self-propelled farming and construction equipment, boats and aircraft.~~

...

UN Model Regulations, Special Provision 363 (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider the following:

The following provision has been added to SP 363 of the UN Model Regulations:

“This entry may only be used when the conditions of this special provision are met. No other requirements of these Regulations apply.”

It has not been proposed for inclusion in Special Provision A208 of the Technical Instructions as Special Provision A70, assigned to 3528 (flammable liquid powered internal combustion or fuel cell machinery or engines) and 3529 (Flammable gas powered internal combustion or fuel cell machinery or engines), provides an exception from the Instructions under certain circumstances.

However, there is no exception applied to UN 3530 (internal combustion machinery or engine assigned to Class 9)

The amendment to SP 363 (f) was also not made as A70 does not except other batteries or other dangerous goods contained in the machinery or engine.

A208 (≈363) a) This entry applies to engines or machinery, powered by fuels classified as dangerous goods via internal combustion systems or fuel cells (e.g. combustion engines, generators, compressors, turbines, heating units).

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- b) Engines and machinery containing fuels meeting the classification criteria of Class 3 must be consigned under the entries UN 3528 — **Engine, internal combustion, flammable liquid powered** or UN 3528 — **Engine, fuel cell, flammable liquid powered** or UN 3528 — **Machinery, internal combustion, flammable liquid powered** or UN 3528 — **Machinery, fuel cell, flammable liquid powered**, as appropriate.
- c) Engines and machinery containing fuels meeting the classification criteria of Division 2.1 must be consigned under the entries UN 3529 — **Engine, internal combustion, flammable gas powered** or UN 3529 — **Engine, fuel cell, flammable gas powered** or UN 3529 — **Machinery, internal combustion, flammable gas powered** or UN 3529 — **Machinery, fuel cell, flammable gas powered**, as appropriate.

Engines and machinery powered by both a flammable gas and a flammable liquid must be consigned under the appropriate UN 3529 entry.

- d) Engines and machinery containing liquid fuels meeting the classification criteria for environmentally hazardous substances and not meeting the classification criteria of any other class or division, must be consigned under the entries UN 3530 — **Engine, internal combustion** or UN 3530 — **Machinery, internal combustion**, as appropriate.

~~Note. Until 31 March 2017, shippers may identify engines as Class 9, UN 3166 using the proper shipping names and Packing Instruction 950 or 951 as shown in the 2015-2016 Edition of these Instructions. In that instance the dangerous goods transport document must indicate the packing instruction number and the UN number and proper shipping name in effect in the 2015-2016 Edition of these Instructions. The marks and labels applied, when required, must be consistent with the information shown on the dangerous goods transport document.~~

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UN Model Regulations, Special Provision 387 (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider the quantity limitations incorporated in the UN Model Regulations which are highlighted below and determine whether they are appropriate for the Technical Instructions.

A213 (387) Lithium batteries in conformity with 2.9.3.1 f) containing both primary lithium metal cells and rechargeable lithium ion cells must be assigned to UN Nos. 3090 or 3091 as appropriate. When such batteries are transported in accordance with Section II of Packing Instruction 968, 969 or 970, the total lithium content of all lithium metal cells contained in the battery not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh.

...

UN Model Regulations, Special Provision 388 (see ST/SG/AC.10/44/Add.1)

DGP-WG/17 proposed editorial amendments to first, second, third, and seventh paragraphs below (i.e. first paragraph: "... **flammable** gas internal combustion engines ...", second, third and seventh paragraphs: "... be consigned under the entries **assigned to**"

A214 (388) UN No. 3166 entries apply to vehicles powered by flammable liquid or flammable gas internal combustion engines or fuel cells.

Vehicles powered by a fuel cell engine must be assigned to UN 3166 **Vehicle, fuel cell, flammable gas powered** or UN 3166 **Vehicle, fuel cell, flammable liquid powered**, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

Other vehicles which contain an internal combustion engine must be assigned to UN 3166 **Vehicle, flammable gas powered** or UN 3166 **Vehicle, flammable liquid powered**, as appropriate. These entries

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include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be assigned to UN 3166 **Vehicle, flammable gas powered.**

Entry UN 3171 only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries transported with these batteries installed.

For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles transported in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be assigned to UN 3091 **Lithium metal batteries contained in equipment** or UN 3091 **Lithium metal batteries packed with equipment** or UN 3481 **Lithium ion batteries contained in equipment** or UN 3481 **Lithium ion batteries packed with equipment**, as appropriate.

UN Model Regulations, Special Provision 388 (see ST/SG/AC.10/44/Add.1)

The following UN text is struck out in alignment with current Special Provision A207. DGP/25 decided not to add this text to the special provision as the provisions were already adequately addressed in Packing Instructions 950 and 951.

~~Dangerous goods, such as batteries, airbags, fire extinguishers, compressed gas accumulators, safety devices and other integral components of the vehicle that are necessary for the operation of the vehicle or for the safety of its operator or passengers, must be securely installed in the vehicle and are not otherwise subject to these Instructions. However, lithium batteries must meet the provisions of 2.9.3.1, except that 2.9.3.1 a) does not apply when pre-production prototype batteries or batteries of a small production run, consisting of not more than 100 batteries, are installed in vehicles or equipment.~~

~~Where a lithium battery installed in a vehicle or equipment is damaged or defective, the vehicle or equipment shall be transported as defined by the competent authority.~~

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UN Model Regulations, Special Provision 3891 (see ST/SG/AC.10/44/Add.1) , see paragraph 3.2.3.2.1 a) of this report

The following special provision added to the UN Model Regulations is not proposed for inclusion in the Technical Instructions. The dedicated working group tasked with reviewing the amendments at DGP-WG/17 concluded that lithium ion or lithium metal batteries installed in cargo transport units should be forbidden for transport by air under normal circumstances but that a special provision be developed so as to allow their transport under certain conditions with the approval of the State of Origin and State of the Operator. A dedicated working group will consider special provisions for inclusion in the Supplement:

389 This entry only applies to lithium ion batteries or lithium metal batteries installed in a cargo transport unit and designed only to provide power external to the cargo transport unit. The lithium batteries shall meet the requirements of 2.9.4 (a) to (e) and contain the necessary systems to prevent overcharge and over discharge between the batteries.

The batteries shall be securely attached to the interior structure of the cargo transport unit (e.g., by means of placement in racks, cabinets, etc.) in such a manner as to prevent short circuits, accidental operation, and significant movement relative to the cargo transport unit under the shocks, loadings and vibrations normally incident to transport. Dangerous goods necessary for the safe and proper operation of the cargo transport unit (e.g., fire extinguishing systems and air conditioning systems), shall be properly secured to or installed in the cargo transport unit and are not otherwise subject to these Regulations. Dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be transported within the cargo transport unit.

The batteries inside the cargo transport unit are not subject to marking or labelling requirements. The cargo transport unit shall display the UN number in accordance with 5.3.2.1.2 and be placarded on two opposing sides in accordance with 5.3.1.1.2.

...

UN Model Regulations, Special Provision 391 (see ST/SG/AC.10/44/Add.1)

The dedicated working group tasked with reviewing the amendments at DGP-WG/17 proposed that the articles n.o.s. that the following special provision is assigned to in the UN Model Regulations should be forbidden from transport by air under normal circumstances unless approval was granted by the State of Origin and the State of the Operator in accordance with Special Provision A2. An ad hoc group will develop provisions for inclusion in the DGP/26 working paper on UN harmonization (see paragraph 3.2.2.1.3 of this report). It is therefore not recommended for adoption in the Technical Instructions

~~A215 (391) Articles containing dangerous goods of Division 2.3, or Division 4.2, or Division 4.3, or Division 5.1, or Division 5.2 or Division 6.1 for substances of inhalation toxicity requiring Packing Group I and articles containing more than one of the hazards listed in Part 2, Introductory Chapter, paragraph 4.1 b), c), or d) must be transported under conditions approved by the appropriate national authority.~~

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UN Model Regulations, Special Provision 392 (see ST/SG/AC.10/44/Add.1)

DGP-WG/17 determined that the following would not be included in the Technical Instructions (see paragraph 3.2.3.2.1 g) f this report:

~~A216 (392) For the transport of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of Part 4, Chapter 3 to 11 and Part 6:5 of these Instructions need not be applied when transported for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the following conditions are met:~~

~~a) The fuel gas containment systems must meet the requirements of the standards or regulations for fuel tanks for vehicles, as applicable. Examples of applicable standards and regulations are:~~

~~**LPG tanks**~~

~~ECE Regulation No. 67 Revision 2~~

~~Uniform provisions concerning:~~

- ~~I. Approval of specific equipment of vehicles of category M and N using liquefied petroleum gases in their propulsion system;~~
~~II. Approval of vehicles of category M and N fitted with specific equipment for the use of liquefied petroleum gases in their propulsion system with regard to the installation of such equipment~~

~~ECE Regulation No. 115~~

~~Uniform provisions concerning the approval of:~~

- ~~I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems;~~
~~II. Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system~~

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CNG tanks

ECE Regulation No. 110

Uniform provisions concerning:

I. Specific components of motor vehicles using compressed natural gas (CNG) in their propulsion system;

II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) in their propulsion system

ECE Regulation No. 115

(Uniform provisions concerning the approval of:

I. Specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion systems;

II. Specific CNG (compressed natural gas) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system)

ISO 11439:2013

Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles

ISO 15500 Series

ISO 15500: Road vehicles — Compressed natural gas (CNG) fuel system components — several parts as applicable

ANSI NGV 2

Compressed natural gas vehicle fuel containers

GSA B51 Part 2: 2014

Boiler, pressure vessel, and pressure piping code Part 2 Requirements for high pressure cylinders for on-board storage of fuels for automotive vehicles

Hydrogen pressure tanks

Global Technical Regulation (GTR) No. 13

Global technical regulation on hydrogen and fuel cell vehicles (ECE/TRANS/180/Add.13);

ISO/TS 15869:2009

Gaseous hydrogen and hydrogen blends — Land vehicle fuel tanks

Regulation (EC) No. 79/2009

Regulation (EC) No. 79/2009 of the European Parliament and of the Council of 14 January 2009 on type approval of hydrogen powered motor vehicles, and amending Directive 2007/46/EC

Regulation (EU) No. 406/2010

Commission Regulation (EU) No 406/2010 of 26 April 2010 implementing Regulation (EC) No 79/2009 of the European Parliament and of the Council on type approval of hydrogen powered motor vehicles;

ECE Regulation No. 134

Hydrogen and fuel cell vehicles (HFCV)

GSA B51 Part 2: 2014

Boiler, pressure vessel, and pressure piping code Part 2 Requirements for high pressure cylinders for on-board storage of fuels for automotive vehicles

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~~Gas tanks designed and constructed in accordance with previous versions of relevant standards or regulations for gas tanks for motor vehicles, which were applicable at the time of the certification of the vehicles for which the gas tanks were designed and constructed may continue to be transported;~~

- ~~b) The fuel gas containment systems must be leakproof and must not exhibit any signs of external damage which may affect their safety;~~

~~— Note 1. — Criteria may be found in standard ISO 11623:2015 Transportable gas cylinders — Periodic inspection and testing of composite gas cylinders (or ISO 19078:2013 Gas cylinders — Inspection of the cylinder installation, and requalification of high pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles);~~

~~— Note 2. — If the fuel gas containment systems are not leakproof or are overfilled or if they exhibit damage that could affect their safety (e.g. in case of a safety related recall), they must only be carried in salvage pressure receptacles in conformity with these Instructions;~~

- ~~c) If a fuel gas containment system is equipped with two valves or more integrated in line, the two valves must be closed as to be gastight under normal conditions of transport. If only one valve exists or only one valve works all openings with the exception of the opening of the pressure relief device, it must be closed as to be gastight under normal conditions of transport;~~
- ~~d) Fuel gas containment systems must be transported in such a way as to prevent obstruction of the pressure relief device or any damage to the valves and any other pressurised part of the fuel gas containment systems and unintentional release of the gas under normal conditions of transport. The fuel gas containment system must be secured in order to prevent slipping, rolling or vertical movement;~~
- ~~e) Valves must be protected by one of the methods described in 2.4.1.1.8 a) to e);~~
- ~~f) Except for the case of fuel gas containment systems removed for disposal, recycling, repair, inspection or maintenance, they must be filled with not more than 20 per cent of their nominal filling ratio or nominal working pressure, as applicable;~~
- ~~g) Notwithstanding the provisions of Parts 5.2 and 5.3, when fuel gas containment systems are consigned in a handling device, markings and labels may be affixed to the handling device; and~~
- ~~h) Notwithstanding the provisions of 5.4.1.5 the information on the total quantity of dangerous goods may be replaced by the following information:~~
- ~~i) The number of fuel gas containment systems; and~~
- ~~ii) In the case of liquefied gases the total net mass (kg) of gas of each fuel gas containment system and, in the case of compressed gases, the total water capacity (L) of each fuel gas containment system followed by the nominal working pressure;~~

~~Examples for information in the transport document:~~

~~Example 1: — “UN 1971 natural gas, compressed, 2.1, 1 fuel gas containment system of 50 L in total, 200 bar”;~~

~~Example 2: — “UN 1965 hydrocarbon gas mixture, liquefied, n.o.s., 2.1, 3 fuel gas containment systems, each of 15 kg net mass of gas”;~~

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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:

The Model Regulations do not contain the text being proposed for amendment below. The amendments proposed are in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Class 2	Only UN 1950 in Divisions 2.1 and 2.2, UN 2037 in Divisions 2.1 and 2.2 without a subsidiary risk <u>hazard</u> , UN 3478 (Fuel cell cartridges , containing liquefied flammable gas) and UN 3479 (Fuel cell cartridges , containing hydrogen in metal hydride)
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...

Note.— Many articles or substances, including the following, are NOT permitted under these limited quantity provisions:

- a) those permitted only on cargo aircraft;
- b) those in Packing Group I;
- c) those in Class 1 or 7 or Divisions 2.1 (except as permitted above), 2.3 or 6.2;
- d) those in Division 4.2 or with a subsidiary ~~risk~~ hazard of 4.2.

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Chapter 5

DANGEROUS GOODS PACKED IN EXCEPTED QUANTITIES

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DGP-WG/16-WP/54 (see paragraph 3.2.4.2):

5.1 EXCEPTED QUANTITIES

5.1.2.1 For gases, the volume indicated for inner packagings refers to the water capacity of the inner receptacle and the volume indicated for outer packagings refers to the combined water capacity of all inner packagings within a single outer ~~package~~ packaging.

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5.3 TESTS FOR PACKAGES

5.3.1 The complete package as prepared for transport, with inner packagings filled to not less than 95 per cent of their capacity for solids or 98 per cent for liquids, must be capable of withstanding, as demonstrated by testing which is appropriately documented, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:

...

DGP-WG/16-WP/54 (see paragraph 3.2.3.3):

- b) a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the drop sample).

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ICAO translators and editors of versions other than English: There may be a need for amendment to 3.5.4 for the sake of alignment with 3.5.4.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

5.4 MARKING OF PACKAGES

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

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5.6 DE MINIMIS QUANTITIES

Dangerous goods assigned to codes E1, E2, E4 or E5 are not subject to these Instructions when carried as cargo provided that:

DGP-WG/16-WP/54 (see paragraph 3.2.1.6):

- a) the maximum net quantity of material per inner packaging is limited to 1 mL for liquids and gases and 1 g for solids;
- b) the provisions of 5.2 are met, except that an intermediate packaging is not required if the inner packagings are securely packed in an outer packaging with cushioning material in such a way that, under normal conditions of transport, they cannot break, be punctured, or leak their contents; and for liquid dangerous goods, the outer packaging contains sufficient absorbent material to absorb the entire contents of the inner packagings;
- c) the provisions of 5.3 are complied with; and
- d) the maximum net quantity of dangerous goods per outer packaging does not exceed 100 g for solids or 100 mL for liquids and gases.

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Part 4

PACKING INSTRUCTIONS

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Chapter 3

CLASS 1 — EXPLOSIVES

ICAO translators and editors of versions other than English: There may be a need for amendment to 2.3.3.1.7 for the sake of alignment with 4.1.5.12 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

3.3.1.7 Packagings must be made of materials compatible with, and impermeable to, the explosives contained in the package, so that neither interaction between the explosives and the packaging materials, nor leakage, causes the explosive to become unsafe to transport, or the hazard division or compatibility group to change.

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Packing Instruction 101

Inner packagings

Intermediate packagings

Outer packagings

As specified by the appropriate national authority.

UN Model Regulations, Chapter 4.1, packing instruction P101 (see ST/SG/AC.10/44/Add.1)

The ~~State's~~ distinguishing sign ~~for motor~~ used on vehicles in international road traffic of the country for which the authority acts must be marked on the dangerous goods transport document as follows: "Packaging approved by the competent authority of ..."

Note 1.— In this instance the term "competent authority" is used for intermodal compatibility; it refers to the appropriate national authority.

Note 2.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

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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

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UN Model Regulations, 4.1.6.1.4 (see ST/SG/AC.10/44/Add.1)

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~~ hazard must not be authorized for the transport of a Class 2 substance unless the necessary inspection and testing as specified in 6;5.1.6 have been performed.

UN Model Regulations, 4.1.4.1, packing instruction P200 (see ST/SG/AC.10/44/Add.1)

Packing Instruction 200

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

...

e) For liquefied gases charged with compressed gases, both components — the ~~liquid phase~~ liquefied gas and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder.

The maximum mass of contents per litre of water capacity must not exceed 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not completely fill the cylinder at any temperature up to 60°C.

When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansions of all substances in the cylinders must be considered. When experimental data is not available, the following steps must be carried out:

- i) Calculation of the vapour pressure of the ~~liquid component~~ **liquefied gas** and of the partial pressure of the compressed gas at 15°C (filling temperature);
- ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;
- iii) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.

- iv) Calculation of the vapour pressure of the ~~liquid component~~ **liquefied gas** at 65°C;
- v) Calculation of the total pressure, which is the sum of the vapour pressure of the ~~liquid component~~ **liquefied gas** and the partial pressure of the compressed gas at 65°C;
- vi) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

The test pressure of the cylinder must not be less than the calculated total pressure minus 100 kPa (1bar).

If the solubility of the compressed gas in the ~~liquid component~~ **liquefied phase** is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph (vi)) into account.

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Table 1. COMPRESSED GASES

UN No.	Name and description	Class Or Division	Subsidiary risk hazard	LC ₅₀ ml/m ³	Cylinders	Test period, years	Test pressure, bar*	Maximum working pressure, bar*	Special packing provisions*
...									

Table 2. LIQUEFIED GASES AND DISSOLVED GASES

UN No.	Name and description	Class Or Division	Subsidiary risk hazard	LC ₅₀ ml/m ³	Cylinders	Test period, years	Test pressure, bar	Filling ratio	Special packing provisions
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Packing Instruction 202

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UN Model Regulations, 4.1.4.1, packing instruction P203 (see ST/SG/AC.10/44/Add.1)

7) 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 **hazard** of 5.1), these materials must not react with these gases in a dangerous manner.

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Packing Instruction 211

1.

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

Refrigerating machines or components containing non-toxic liquefied gases or Ammonia solutions (UN 2672) must meet the following requirements:

The following amendments are proposed in accordance with the agreement by the UN Sub-Committee that the word "risk" was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word "hazard" (see ST/SG/AC.10/C.3/98).

- a) each cylinder must not contain more than 450 kg of a Division 2.2 gas without subsidiary-risk **hazard** or 25 kg of Ammonia solutions (UN 2672);
- b) machines or components having two or more charged cylinders may not contain an aggregate of more than 910 kg of a Division 2.2 gas without subsidiary-risk **hazard** or more than 45 kg of Ammonia solutions (UN 2672);
- c) each cylinder must be equipped with a safety device meeting the requirements of a recognized national standard;
- d) each cylinder must be equipped with a shut-off valve at each opening except openings used for safety devices and with no other connection. These valves must be closed prior to and during transport;
- e) cylinders must be manufactured, inspected and tested in accordance with a recognized UN or national standard;
- f) all parts subject to refrigerant pressure during shipment must be tested in accordance with a recognized UN or national standard;
- g) the liquid portion of the refrigerant, if any, must not completely fill any pressure vessel at 55°C;
- h) the amount of refrigerant, if liquefied, must not exceed the filling density prescribed by applicable State regulations.

Packing Instruction 218

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UN Model Regulations, 4.1.4.1, packing instruction P206 (see ST/SG/AC.10/44/Add.1)

ADDITIONAL PACKING REQUIREMENTS

- a) Cylinders must be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity, and they are not completely filled at 60°C. When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansion of all substances in the cylinders must be taken into account.
- b) Spray application equipment (such as a hose and wand assembly) must not be connected during transport.
- c) The minimum test pressure must be in accordance with Packing Instruction 200 for the propellant but must not be less than 20 bar.
- d) Non-refillable cylinders used may have a water capacity in litres not exceeding 1 000 litres divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with ISO 11118:1999, which limits the maximum capacity to 50 litres.
- e) For liquids charged with a compressed gas, both components — the ~~liquid phase~~ **liquefied gas** and the compressed gas — have to be taken into consideration in the calculation of the internal pressure in the cylinder. When experimental data is not available, the following steps must be carried out:
 - i) Calculation of the vapour pressure of the ~~liquid component~~ **liquefied gas** and of the partial pressure of the compressed gas at 15°C (filling temperature);
 - ii) Calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;
 - iii) Calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

Note.— The compressibility factor of the compressed gas at 15°C and 65°C must be considered.
 - iv) Calculation of the vapour pressure of the ~~liquid component~~ **liquefied gas** at 65°C;
 - v) Calculation of the total pressure, which is the sum of the vapour pressure of the ~~liquid component~~ **liquefied gas** and the partial pressure of the compressed gas at 65°C;
 - vi) Consideration of the solubility of the compressed gas at 65°C in the liquid phase.

The test pressure of the cylinders must not be less than the calculated total pressure minus 100 kPa (1 bar).

If the solubility of the compressed gas in the ~~liquid component~~ **phase** is not known for the calculation, the test pressure can be calculated without taking the gas solubility (sub-paragraph vi) into account.

OUTER PACKAGINGS

Boxes

Drums

Jerricans

Strong outer packagings

Packing Instruction 220

Cargo aircraft only for UN 3529 only

(See Packing Instruction 378 for flammable liquid-powered engines or machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles, Packing Instruction 952 for battery-powered equipment and vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

General requirements

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

Compatibility requirements

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

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 3529 Engine, internal combustion, flammable gas powered or Machinery, internal combustion, flammable gas powered or Engine, fuel cell, flammable gas powered or Machinery, fuel cell, flammable gas powered	Forbidden	No limit

ADDITIONAL PACKING REQUIREMENTS

General

UN Model Regulations, Chapter 3.3, Special Provision 363 (see ST/SG/AC.10/44/Add.1)

There may be an error in ST/SG/AC.10/44/Add.1. The renumbering of sub-paragraphs doesn't seem to make sense (i.e. delete first sub-paragraph, which is "(i)" then renumber existing "(i)" etc.

- ~~1) The engine or machinery, including the means of containment containing dangerous goods, must be in compliance with the construction requirements specified by the appropriate national authority;~~
- ~~2) The engines or machinery must be oriented to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the engines or machinery to prevent any movement during transport which would change the orientation or cause them to be damaged.~~

...

...

UN Model Regulations, 4.1.4.1, Packing Instruction P006 (see ST/SG/AC.10/44/Add.1) and paragraph 3.2.2.1.2 and 3.2.2.1.3 of this report)

A dedicated working group at DGP-WG/17 determined that the articles assigned to P006 of the Model Regulations should be forbidden for transport by air under normal circumstances unless approval was granted by the State of Origin and the State of the Operator in accordance with Special Provision A2 (see paragraphs 3.2.2.1.2 and 3.2.2.1.3). A new packing instruction will be developed for inclusion in the Supplement for inclusion in the DGP/26 paper on UN harmonization. The packing instruction presented in DGP-WG/17-WP/13 for the purpose of discussion is therefore deleted.

Packing Instruction 221

Passenger and cargo aircraft for UN 3537 and 3538 only

General requirements

The general packing requirements of 4:1

<u>UN number and name</u>	<u>Packing conditions</u>	<u>Net quantity per package</u>	
		<u>Passenger</u>	<u>Cargo</u>
<u>UN 3537 — Articles containing flammable gas, n.o.s.*</u>	<u>Packaging as set out in the list of outer packagings below may be used:</u>	<u>2</u>	<u>2</u>
<u>UN 3538 — Articles containing non-flammable, non-toxic gas, n.o.s.*</u>	<u>Robust articles may be transported in strong outer packagings constructed of suitable material and of adequate strength and design in relation to the packaging capacity and its intended use. The packagings must meet the provisions of 4:1.1.1, 4:1.1.3.1, 4:1.1.12 and 4:2 in order to achieve a level of protection that is at least equivalent to that provided by Part 6:1. Articles may be transported unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained.</u>		

ADDITIONAL PACKING REQUIREMENTS

- Packagings must meet the Packing Group II performance requirements.
- Receptacles within articles containing liquids or solids must be constructed of suitable materials and secured in the article in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents into the article itself or the outer packaging;
- Receptacles containing liquids with closures must be packed with their closures correctly oriented. The receptacles must in addition conform to the internal pressure test provisions of 6:4.5;
- Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials must be properly secured. Any leakage of the contents must not substantially impair the protective properties of the article or of the outer packaging;
- Receptacles within articles containing gases must meet the requirements of 4:4.1 and 6:5 as appropriate or be capable of providing an equivalent level of protection as Packing Instructions 200 or 210;
- Where there is no receptacle within the article, the article must fully enclose the dangerous substances and prevent their release under normal conditions of transport;
- Articles must be packed to prevent movement and inadvertent operation during normal conditions of transport.

<u>OUTER PACKAGINGS</u>		
<u>Boxes</u>	<u>Drums</u>	<u>Jerricans</u>
<u>Aluminium (4B)</u>	<u>Aluminium (1B2)</u>	<u>Aluminium (3B2)</u>
<u>Fibreboard (4G)</u>	<u>Fibre (1G)</u>	<u>Plastics (3H2)</u>
<u>Natural wood (4C1, 4C2)</u>	<u>Other metal (1N2)</u>	<u>Steel (3A2)</u>
<u>Other metal (4N)</u>	<u>Plastics (1H2)</u>	
<u>Plastics (4H1, 4H2)</u>	<u>Plywood (1D)</u>	
<u>Plywood (4D)</u>	<u>Steel (1A2)</u>	
<u>Reconstituted wood (4F)</u>		
<u>Steel (4A)</u>		

...

Chapter 5

CLASS 3 — FLAMMABLE LIQUIDS

The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

...

Chapter 6

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

The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

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Packing Instruction 459

Passenger and cargo aircraft — self-reactive substances and polymerizing substances

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ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

- Cushioning materials must not be readily combustible.
- Packagings must meet the Packing Group II performance requirements.

 UN Model Regulations, 4.1.4.1, P520, new PP94 (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider whether the following provisions belong in this packing instruction. Item 5 below is modified from UN Model Regulations to align with similar provisions in the Technical Instructions

UN 3223 or UN 3224

Very small amounts of energetic samples of Part 2, Introductory Chapter, paragraph 5.4 may be carried under UN 3223 or UN 3224, as appropriate, provided that:

1. Only combination packaging with outer packaging comprising boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1 and 4H2) are used;
 2. The samples are carried in microtiter plates or multi-titer plates made of plastics, glass, porcelain or stoneware as inner packaging;
 3. The maximum amount per individual inner cavity does not exceed 0.01 g for solids or 0.01 mL for liquids;
 4. The maximum net quantity per outer packaging is 20 g for solids or 20 mL for liquids, or in the case of mixed packing the sum of grammes and millilitres does not exceed 20; and
 5. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, all applicable requirements of these Instructions must be met. Interior supports must be provided to secure the inner packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met. The inner and outer packagings must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.
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 UN Model Regulations, 4.1.4.1, P520, new PP95 (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider whether the following provisions belong in this packing instruction. Item 6 below is modified from UN Model Regulations to align with similar provisions in the Technical Instructions

Small amounts of energetic samples of Part 2, Introductory Chapter, paragraph 5.4 may be carried under UN 3223 or UN 3224, as appropriate, provided that:

1. The outer packaging consists only of corrugated fibreboard of type 4G having minimum dimensions of 60 cm (length) by 40.5 cm (width) by 30 cm (height) and minimum wall thickness of 1.3 cm;
2. The individual substance is contained in an inner packaging of glass or plastics of maximum capacity of 30 mL placed in an expandable polyethylene foam matrix of at least 130 mm thickness having a density of 18 ±1 g/L;
3. Within the foam carrier, inner packagings are segregated from each other by a minimum distance of 40 mm and from the wall of the outer packaging by a minimum distance of 70 mm. The package may contain up to two layers of such foam matrices, each carrying up to twenty-eight inner packagings;
4. The maximum content of each inner packaging does not exceed 1 g for solids or 1 mL for liquids;
5. The maximum net quantity per outer packaging is 56 g for solids or 56 mL for liquids, or in the case of mixed packing the sum of grammes and millilitres does not exceed 56; and
6. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, all applicable requirements of these Instructions must be met. Interior supports must be provided to secure the inner packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack must be leakproof. If dry ice is used, the requirements in Packing Instruction 954 must be met. The inner and outer packagings must maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

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Chapter 7

CLASS 5 — OXIDIZING SUBSTANCES; ORGANIC PEROXIDES

The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

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Chapter 8

CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES

The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

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Packing Instruction 620

This packing instruction applies to UN 2814 and UN 2900.

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

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

...

- e) Whatever the intended temperature of the consignment, 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 and temperatures in the range -40°C to $+55^{\circ}\text{C}$. This primary receptacle or secondary packaging must also be capable of withstanding temperatures in the range -40°C to $+55^{\circ}\text{C}$.

...

ICAO translators and editors of versions other than English: There may be a need for amendment to the following provision for the sake of alignment with 4.1.8.1 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

Special packing provisions

- a) 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.

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DGP-WG/16-WP/54 (see paragraph 3.2.4.2):

Packing Instruction 650

...

- 7) For liquid substances:

...

- 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~~ packaging must not contain more than 4 litres. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold.

...

- 8) For solid substances:

...

- d) Except for packages containing body parts, organs or whole bodies, the outer ~~package~~ packaging must not contain more than 4 kg. This quantity excludes ice, dry ice or liquid nitrogen when used to keep specimens cold;
- e) If there is any doubt as to whether or not residual liquid may be present in the primary receptacle during transport, then a packaging suitable for liquids, including absorbent materials, must be used.

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Chapter 9

CLASS 7 — RADIOACTIVE MATERIAL

The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

Chapter 10

CLASS 8 — CORROSIVE SUBSTANCES

The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

...

UN Model Regulations, 4.1.4.1, Packing Instruction P801 (see ST/SG/AC.10/44/Add.1)

There is an amendment to the additional requirements of P801 in the Model Regulations which are not included in the corresponding packing instructions of the Technical Instructions (Packing Instructions 870 and 871). DGP is invited to consider whether these provisions should be added to the Technical Instructions for the sake of harmonization. The provisions in the Model Regulations, including the amendment for the 19th revised edition are:

Additional requirements:

1. Batteries shall be protected against short circuits.
 2. Batteries stacked shall be adequately secured in tiers separated by a layer of electrically non-conductive material.
 3. Battery terminals shall not support the weight of other superimposed elements.
 4. Batteries shall be packaged or secured to prevent inadvertent movement.
-

Packing Instruction 870

Passenger and cargo aircraft for UN 2794 and 2795 only

General requirements

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

1) **Compatibility requirements**

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

2) **Closure requirements**

- Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				
<i>UN number and proper shipping name</i>	<i>Packing conditions</i>	<i>Total quantity per package — passenger</i>	<i>Total quantity per package — cargo</i>	SINGLE PACKAGINGS
UN 2794 Batteries, wet, filled with acid UN 2795 Batteries, wet, filled with alkali	<p>Batteries must be placed in an acid/alkali-proof liner of sufficient strength and adequately sealed to positively preclude leakage in the event of spillage. The batteries must be packed so that the fill openings and vents, if any, are upward; they must be incapable of short-circuiting and be securely cushioned in the packagings. The upright position of the package must be indicated on it by "Package orientation" labels (Figure 5-29) as required by 5;3. The words "This side up" or "This end up" may also be displayed on the top of the package.</p> <p><i>Batteries installed in equipment</i></p> <p>If batteries are shipped as an integral component of assembled equipment, they must be securely installed and fastened in an upright position and protected against contact with other articles so as to prevent short circuits. Batteries must be removed and packed according to this packing instruction if the assembled equipment is likely to be carried in other than an upright position.</p>	30 kg	No limit	Unpackaged batteries No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

- Packagings must meet the Packing Group II performance requirements.
- For batteries, electric storage, packed with battery fluid in the same outer packaging, see UN 2796 and UN 2797.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)*Boxes*

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

Packing Instruction 871

Passenger and cargo aircraft for UN 3028 only

General requirements

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

1) Compatibility requirements

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

2) Closure requirements

- Closures must meet the requirements of 4;1.1.4.

COMBINATION PACKAGINGS				SINGLE PACKAGINGS
<i>UN number and proper shipping name</i>	<i>Packing conditions</i>	<i>Total quantity per package — passenger</i>	<i>Total quantity per package — cargo</i>	
UN 3028 Batteries, dry, containing potassium hydroxide solid	The batteries must be securely cushioned in the packagings.	25 kg	230 kg	No

ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

- Packagings must meet the Packing Group II performance requirements.

OUTER PACKAGINGS OF COMBINATION PACKAGINGS (see 6;3.1)

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Plastics (4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

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Chapter 11

CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

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The following amendment is proposed in accordance with the agreement by the UN Sub-Committee that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

Replace all references to “subsidiary risk” with “subsidiary hazard”

...

Packing Instruction 952

Passenger and cargo aircraft for UN 3171 only
(See Packing Instruction 220 for flammable gas-powered engines and machinery, Packing Instruction 378 for flammable liquid-powered engines and machinery, Packing Instruction 950 for flammable liquid-powered vehicles, Packing Instruction 951 for flammable gas-powered vehicles or Packing Instruction 972 for engines or machinery containing only environmentally hazardous fuels)

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ADDITIONAL PACKING REQUIREMENTS

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Where vehicles could possibly be handled in other than an upright position, the vehicle must be secured in a strong, rigid outer packaging of the type below. The vehicle must be secured by means capable of restraining the vehicle in the outer packaging to prevent any movement during transport which would change the orientation or cause the vehicle to be damaged.

Battery-powered vehicles, machines or equipment must meet the following requirements:

Batteries

All batteries must be installed and securely fastened in the battery holder of the vehicle, machine or equipment and must be protected in such a manner so as to prevent damage and short circuits. In addition:

- 1) if spillable batteries are installed, and it is possible for the vehicle, machine or equipment to be handled in such a way that batteries would not remain in their intended orientation, they must be removed and packed according to Packing Instruction 492 or 870 as applicable;

DGP-WG/17-WP/5 (see paragraph 3.2.4.1 of this report):

- 2) if lithium batteries are installed in a vehicle, they must meet the provisions of subparagraphs a) to e) of Part 2;9.3.1, unless otherwise approved by the appropriate authority of the State of Origin, ~~must be securely fastened in the vehicle and must be protected in such a manner so as to prevent damage and short circuits~~ Where the lithium battery is removed from the vehicle and is packed separate from the vehicle in the same outer packaging, the package must be consigned as UN 3481— Lithium ion batteries packed with equipment or UN 3091 — Lithium metal batteries packed with equipment and packed according to Packing Instruction 966 or 969 as applicable; and
- 3) if sodium batteries are installed they must conform to the requirements of Special Provision A94.

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Packing Instruction 955

Passenger and cargo aircraft for UN 2990 and UN 3072 only

The term "life-saving appliances" applies to articles such as life rafts, life vests, aircraft survival kits or aircraft evacuation slides.

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.

General requirements

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

1) **Compatibility requirements**

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

2) **Closure requirements**

- Closures must meet the requirements of 4;1.1.4.

<i>UN number and proper shipping name</i>	<i>Quantity — passenger</i>	<i>Quantity — cargo</i>
UN 2990 Life-saving appliances, self-inflating UN 3072 Life-saving appliances, not self-inflating containing dangerous goods as equipment	No limit	No limit

ADDITIONAL PACKING REQUIREMENTS

Life-saving appliances may only contain the dangerous goods listed below:

- a) Division 2.2 gases, must be contained in cylinders which conform to the requirements of the appropriate national authority of the country in which they are approved and filled. Such cylinders may be connected to the life-saving appliance. These cylinders may include installed actuating cartridges (cartridges, power device of Division 1.4C and 1.4S) provided the aggregate quantity of deflagrating (propellant) explosives does not exceed 3.2 grams per unit. When the cylinders are shipped separately, they must be classified as appropriate for the Division 2.2 gas contained and need not be marked, labelled or described as explosive articles;
- b) signal devices (Class 1), which may include smoke and illumination signal flares; signal devices must be packed in plastic or fibreboard inner packagings;
- c) small quantities of flammable substances, corrosive solids and organic peroxides (Class 3, Class 8, Division 4.1 and 5.2), which may include a repair kit and not more than 30 strike-anywhere matches. The organic peroxide may only be a component of a repair kit and the kit must be packed in strong inner packaging. The strike-anywhere matches must be packed in a cylindrical metal or composition packaging with a screw-type closure and be cushioned to prevent movement;
- d) electric storage batteries (Class 8), which must be disconnected or electrically isolated and protected against short circuits;
- e) lithium batteries:
 - 1) must meet the applicable requirements of 2;9.3;
 - 2) must be disconnected or electrically isolated and protected against short circuits; and
 - 3) must be secured against movement within the appliance.
- f) first aid kits which may include flammable, corrosive and toxic articles or substances.

The appliances must be packed, so that they cannot be accidentally activated, in strong outer packagings and, except for life vests, the dangerous goods must be in inner packagings packed so as to prevent movement. The dangerous goods must be an integral part of the appliance without which it would not be operational and in quantities which do not exceed those appropriate for the actual appliance when in use.

Packing Instruction 955

UN Model Regulations, Chapter 3.3, Special Provision 296 (see ST/SG/AC.10/44/Add.1)

There may be an error in ST/SG/AC.10/44/Add.1 which specifies that the amendment to SP 296 does not apply to the English version. The last paragraph of SP 296 uses the term “subsidiary risk”. Suggest it needs to be replaced with “subsidiary hazard” as proposed below (the provisions in SP 296 are contained in this packing instruction instead of a special provision in the Technical Instructions).

Life-saving appliances packed in strong rigid outer packagings with a total maximum gross mass of 40 kg, containing no dangerous goods other than Division 2.2 compressed or liquefied gases with no subsidiary-risk **hazard** in receptacles with a capacity not exceeding 120 mL, installed solely for the purpose of the activation of the appliance, are not subject to these Instructions when carried as cargo.

Life-saving appliances may also include articles and substances not subject to these Instructions which are an integral part of the appliance.

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Packing Instruction 961

Passenger and cargo aircraft for UN 3268 only

UN Model Regulations, Chapter 4.1.4.1, packing instruction P902 (see ST/SG/AC.10/44/Add.1)

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ADDITIONAL PACKING REQUIREMENTS FOR COMBINATION PACKAGINGS

- Packagings must meet the Packing Group III performance requirements.
- The packagings must be designed and constructed to prevent movement of the articles and inadvertent operation during normal conditions of transport.
- Any pressure receptacle must be in accordance with the requirements of the appropriate national authority for the substance(s) contained therein.

Cargo aircraft only

Air bag inflators, air bag modules and seat-belt pretensioners may also be transported unpackaged on cargo aircraft in dedicated handling devices when transported ~~from where they are manufactured to vehicle assembly plants~~ to, from, or between where they are manufactured and an assembly plant including intermediate handling locations. When transported in handling devices, the following conditions must be met:

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Packing Instruction 962

Passenger and cargo aircraft for UN 3363 only

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ADDITIONAL PACKING REQUIREMENTS

UN Model Regulations, Chapter 3.3, Special Provision 301 (see ST/SG/AC.10/44/Add.1)

- If the machinery or apparatus contains more than one item of dangerous goods, the individual dangerous goods must be enclosed to prevent them reacting dangerously with one another during transport (see 4;1.1.3).
- Receptacles containing dangerous goods must be so secured or cushioned so as to prevent their breakage or leakage and so as to control their movement within the machinery or apparatus during normal conditions of transport. Cushioning material must not react dangerously with the contents of the receptacles. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.
- "Package orientation" labels (Figure 5-29), or preprinted orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780-1997 must be affixed on at least two opposite vertical sides with the arrows pointing in the correct direction only when required to ensure liquid dangerous goods remain in their intended orientation.
- Irrespective of 5;3.2.10, machinery or apparatus containing magnetized material meeting the requirements of Packing Instruction 953 must also bear the "Magnetized material" label (Figure 5-27).
- For Division 2.2 gases, cylinders for gases, their contents and filling ratios must conform to the requirements of Packing Instruction 200.
- Dangerous goods in apparatus or machinery must be packed in strong outer packagings unless the receptacles containing the dangerous goods are afforded adequate protection by the construction of the apparatus or machinery.

Fuel system components

- Fuel system components must be emptied of fuel as far as practicable and all openings must be sealed securely. They must be packed:
 - 1) in sufficient absorbent material to absorb the maximum amount of liquid which may possibly remain after emptying. Where the outer packaging is not liquid tight, a means of containing the liquid in the event of leakage must be provided in the form of a leakproof liner, plastic bag or other equally efficient means of containment; and
 - 2) in strong outer packagings.

Packing Instruction Y963

DGP-WG/17-WP/21 (see paragraph 3.2.4.3):

Limited quantities

Passenger and cargo aircraft for ID 8000 only

Consumer commodities are materials that are packaged and distributed in a form intended or suitable for retail sale for the purposes of personal care or household use. These include items administered or sold to patients by doctors or medical administrations. Except as otherwise provided below, dangerous goods packed in accordance with this packing instruction do not need to comply with 4;1 or Part 6 of these Instructions; they must, however, comply with all other applicable requirements.

- a) Each packaging must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during air transport.

...

DGP-WG/16-WP/54 (see paragraph 3.2.4.1):

- f) Inner packagings containing liquids, ~~excluding flammable liquids in inner packagings of 120 mL or less,~~ must be packed with their closures upward and the upright position of the package must be indicated by "Package orientation" labels (Figure 5-29). These labels, or pre-printed package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780-1997, must be affixed to, or printed on, at least two opposite vertical sides of the package with the arrows pointing in the correct direction. The requirements of this sub-paragraph do not apply to:

- 1) dangerous goods in inner packagings each containing not more than 120 mL with sufficient absorbent material between the inner and outer packagings to completely absorb the liquid contents; or
- 2) dangerous goods in gas tight inner packagings such as tubes, bags or vials which are opened by breaking or puncturing.

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Packing Instruction 965

Cargo aircraft only for UN 3480

1. Introduction

This entry applies to lithium ion or lithium polymer batteries. This packing instruction is structured as follows:

- Section IA applies to lithium ion cells with a Watt-hour rating in excess of 20 Wh and lithium ion batteries with a Watt-hour rating in excess of 100 Wh, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
- Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II; and
- Section II applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities not exceeding the allowance permitted in Section II, Table 965-II.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. Lithium batteries forbidden from transport

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

IA. SECTION IA

Each cell or battery must meet all the provisions of 2;9.3.

IA.1 General requirements

- Part 4;1 requirements must be met.
- Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

Table 965-IA

<i>UN number and proper shipping name</i>	<i>Net quantity per package</i>	
	<i>Passenger</i>	<i>Cargo</i>
UN 3480 Lithium ion batteries	Forbidden	35 kg

Packing Instruction 965

IA.2 Additional requirements

- Lithium ion cells and batteries must be protected against short circuits.
- Lithium ion cells and batteries must be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

- Lithium ion cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
- Lithium ion batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be transported when packed in strong outer packagings or protective enclosures (e.g. in fully enclosed or wooden slatted crates) not subject to the requirements of Part 6 of these Instructions, if approved by the appropriate authority of the State of Origin. A copy of the document of approval must accompany the consignment.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

IA.3 Outer packagings

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

IB. SECTION IB

Quantities of lithium ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the provisions of Part 6.

Lithium ion cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number "965" required by 5;4.1.5.8.1 a) must be supplemented with "IB". All other applicable provisions of Part 5;4 apply.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009;

Packing Instruction 965

IB.1 General requirements

- Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).
- Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity. Cells and/or batteries at a state of charge greater than 30 per cent of their rated capacity may only be shipped with the approval of the State of Origin and the State of the Operator under the written conditions established by those authorities.

Note.— *Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.*

Table 965-IB

Contents	Net quantity per package	
	Passenger	Cargo
Lithium ion cells and batteries	Forbidden	10 kg

IB.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong rigid outer packaging.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

- Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).

UN Model Regulations, Chapter 3.3, Special Provision 188 (d) (see ST/SG/AC.10/44/Add.1)

- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with **electrically** conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3) in addition to the appropriate Class 9 hazard label (Figure 5-26) and the cargo aircraft only label (Figure 5-28).

Note.— *The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5;3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.*

IB.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Packing Instruction 965

II. SECTION II

Lithium ion cells and batteries, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General — Transport of dangerous goods by post);
- Part 5;1.1 g) and j) (Shipper's responsibilities — General requirements);

DGP-WG/16-WP/54 (see paragraph 3.5.3.10) (incorporated in 2017-2018 Edition through Addendum/Corrigendum No. 1):

- ~~Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);~~
- Part 7;2.1 (Operator's responsibilities — Loading restrictions on the flight deck and for passenger aircraft);
- Part 7;2.4.1 (Operator's responsibilities — Loading of cargo aircraft);
- Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
- Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
- Paragraphs 1 and 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

II.1 General requirements

- Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).
- Lithium ion cells and batteries must be offered for transport at a state of charge not exceeding 30 per cent of their rated capacity.

Note.— Guidance and methodology for determining the rated capacity can be found in sub-section 38.3.2.3 of the UN Manual of Tests and Criteria.

Table 965-II

<i>Contents</i>	<i>Lithium ion cells and/or batteries with a Watt-hour rating not more than 2.7 Wh</i>	<i>Lithium ion cells with a Watt-hour rating more than 2.7 Wh, but not more than 20 Wh</i>	<i>Lithium ion batteries with a Watt-hour rating more than 2.7 Wh, but not more than 100 Wh</i>
1	2	3	4
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 965-II must not be combined in the same package.

Packing Instruction 965

II.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong rigid outer packaging.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

- ~~Cells and batteries must not be packed in the same outer packaging with other dangerous goods.~~

UN Model Regulations, Chapter 3.3, Special Provision 188 (d) (see ST/SG/AC.10/44/Add.1)

- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with **electrically** conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3) and the cargo aircraft only label (Figure 5-28).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
 - the cargo aircraft only label must be located on the same surface of the package near the lithium battery mark, if the package dimensions are adequate.

~~Note. — The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5.3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.~~

- A shipper is not permitted to offer for transport more than one package prepared according to this section in any single consignment.
- The words “lithium ion batteries, in compliance with Section II of PI965” — cargo aircraft only” or “lithium ion batteries, in compliance with Section II of PI965 — CAO” must be placed on the air waybill, when an air waybill is used.
- Packages and overpacks of lithium ion batteries prepared in accordance with the provisions of Section II must be offered to the operator separately from cargo which is not subject to these Instructions and must not be loaded into a unit load device before being offered to the operator.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Packing Instruction 965

II.4 Overpacks

Not more than one package prepared in accordance with this section may be placed into an overpack.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

Packages prepared in accordance with this section must not be placed into an overpack with packages containing substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).

UN Model Regulations, Chapter 3.3, Special Provision 188 f) (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider replacing “affixed” with “reproduced” for the sake of alignment with the UN Model Regulations and to consider the editorial amendments made to the new text in the Model Regulation with respect to the height of the overpack marking (aligns with similar provisions elsewhere in the Technical Instructions).

When the package is placed in an overpack, the lithium battery mark (Figure 5-3) and the cargo aircraft only label (Figure 5-28) required by this packing instruction must either be clearly visible or the mark and label must be reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Note.— For the purpose of Section II, an overpack is an enclosure used by a single shipper that contains no more than one package prepared in accordance with this section. For shipments prepared in accordance with Section IA and/or IB, this limit of one package of Section II batteries per overpack still applies.

Packing Instruction 966

Passenger and cargo aircraft for UN 3481 (packed with equipment) only

1. Introduction

This entry applies to lithium ion or lithium polymer batteries packed with equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

For the purpose of this packing instruction, "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. Lithium batteries forbidden from transport

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2.9.3.

I.1 General requirements

Part 4.1 requirements must be met.

<i>UN number and proper shipping name</i>	<i>Package quantity (Section I)</i>	
	<i>Passenger</i>	<i>Cargo</i>
UN 3481 Lithium ion batteries packed with equipment	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

Packing Instruction 966

I.2 Additional requirements

- Lithium ion cells and batteries must be protected against short circuits.
- Lithium ion cells or batteries must:
 - be placed in inner packagings that completely enclose the cell or battery then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

I.3 Outer packagings

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

II. SECTION II

Lithium ion cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General — Transport of dangerous goods by post);

DGP-WG/16-WP/54 (see paragraph 3.5.3.10) (incorporated in 2017-2018 Edition through Addendum/Corrigendum No. 1):

-
- [Part 5;2.4.16 \(Shipper's responsibilities — Special marking requirements for lithium batteries\)](#);
 - Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
 - Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
 - Paragraphs 1 and 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside case except for those batteries manufactured before 1 January 2009.

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Packing Instruction 966

Contents	Package quantity (Section II)	
	Passenger	Cargo
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

II.2 Additional requirements

- Lithium ion cells and batteries must:
 - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging.

UN Model Regulations, Chapter 3.3, Special Provision 188 (d) (see ST/SG/AC.10/44/Add.1)

- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with **electrically** conductive materials within the same packaging that could lead to a short circuit.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

Note. — The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5.3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.

- The words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used.
- Where a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment that meet the limits for lithium cells or batteries of Section II, the following additional requirements apply:
 - the shipper must ensure that all applicable parts of both packing instructions are met. The total mass of lithium batteries contained in any package must not exceed 5 kg;
 - the words "lithium ion batteries, in compliance with Section II of PI966" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Packing Instruction 966

II.4 Overpacks

UN Model Regulations, Chapter 3.3, Special Provision 188 f) (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider replacing “affixed” with “reproduced” for the sake of alignment with the UN Model Regulations and to consider the editorial amendments made to the new text in the Model Regulation with respect to the height of the overpack marking (aligns with similar provisions elsewhere in the Technical Instructions).

When packages are placed in an overpack, the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be ~~affixed~~ reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Packing Instruction 967

Passenger and cargo aircraft for UN 3481 (contained in equipment) only

1. Introduction

This entry applies to lithium ion or lithium polymer batteries contained in equipment.

Section I of this packing instruction applies to lithium ion and lithium polymer cells and batteries that are assigned to Class 9. Certain lithium ion and lithium polymer cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a “cell” and must be transported according to the requirements for “cells” for the purpose of this packing instruction.

For the purpose of this packing instruction, “equipment” means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. Lithium batteries forbidden from transport

The following applies to all lithium ion cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

1.1 General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

UN number and proper shipping name	Package quantity (Section I)	
	Passenger	Cargo
UN 3481 Lithium ion batteries contained in equipment	5 kg of lithium ion cells or batteries	35 kg of lithium ion cells or batteries

Packing Instruction 967

I.2 Additional requirements

DGP-WG/16-WP/54 (see paragraph 3.5.3.11):

- The equipment must be secured against movement within the outer packaging and be packed so as to prevent accidental operation during air transport.
- The equipment must be packed in strong rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- Batteries manufactured after 31 December 2011 must be marked with the Watt-hour rating on the outside case.

I.3 Outer packagings

DGP-WG/16-WP/54 (see paragraph 3.5.3.1.3) (incorporated in the 2017-2018 Edition of the Technical Instructions through Addendum/Corrigendum No. 1) (Steel, although not included in DGP-WG/16-WP/54, was also added under "boxes"):

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

~~Strong outer packagings~~

II. SECTION II

Lithium ion cells and batteries contained in equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General — Transport of dangerous goods by post);

DGP-WG/16-WP/54 (see paragraph 3.5.3.10) (incorporated in 2017-2018 Edition through Addendum/Corrigendum No. 1):

- Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
- Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
- Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
- Paragraphs 1 and 2 of this packing instruction.

Lithium ion cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium ion cells, the Watt-hour rating (see the Glossary of Terms in Attachment 2) is not more than 20 Wh;
- 2) for lithium ion batteries, the Watt-hour rating is not more than 100 Wh;
 - the Watt-hour rating must be marked on the outside of the battery case except for those batteries manufactured before 1 January 2009.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

Packing Instruction 967

II.1 General requirements

Equipment must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	Package quantity (Section II)	
	Passenger	Cargo
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

II.2 Additional requirements

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Cells and batteries must be protected so as to prevent short circuits.
- The equipment must be packed in strong rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3). The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
 - This requirement does not apply to:
 - packages containing only button cell batteries installed in equipment (including circuit boards); and
 - packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

Note. — The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5.3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.

- Where a consignment includes packages bearing the lithium battery mark, the words "lithium ion batteries, in compliance with Section II of PI967" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II.4 Overpacks

UN Model Regulations, Chapter 3.3, Special Provision 188 f) (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider replacing "affixed" with "reproduced" for the sake of alignment with the UN Model Regulations and to consider the editorial amendments made to the new text in the Model Regulation with respect to the height of the overpack marking (aligns with similar provisions elsewhere in the Technical Instructions).

When packages are placed in an overpack, the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be ~~affixed~~ **reproduced** on the outside of the overpack and the overpack must be marked with the word "Overpack" **in lettering of at least 12 mm high.**

Packing Instruction 968

Cargo aircraft only for UN 3090

1. Introduction

This entry applies to lithium metal or lithium alloy batteries. This packing instruction is structured as follows:

- Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with a lithium metal content in excess of 2 g, which must be assigned to Class 9 and are subject to all of the applicable requirements of these Instructions;
- Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II; and
- Section II applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with a lithium metal content not exceeding 2 g packed in quantities not exceeding the allowance permitted in Section II, Table 968-II.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a "cell" and must be transported according to the requirements for "cells" for the purpose of this packing instruction.

2. Lithium batteries forbidden from transport

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Waste lithium batteries and lithium batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of Origin and the State of the Operator.

IA. SECTION IA

Each cell or battery must meet all the provisions of 2;9.3.

IA.1 General requirements

Part 4;1 requirements must be met.

Table 968-IA

<i>UN number and proper shipping name</i>	<i>Net quantity per package</i>	
	<i>Passenger</i>	<i>Cargo</i>
UN 3090 Lithium metal batteries	Forbidden	35 kg

IA.2 Additional requirements

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells and batteries must be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

- Lithium metal cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).
- Lithium metal 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 or protective enclosures (e.g. in fully enclosed or wooden slatted crates) 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.

IA.3 Outer packagings*Boxes*

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plastics (4H1, 4H2)
Plywood (4D)
Reconstituted wood (4F)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

IB. SECTION IB

Quantities of lithium metal cells or batteries that exceed the allowance permitted in Section II, Table 968-II, are subject to all of the applicable provisions of these Instructions (including the requirements in paragraph 2 of this packing instruction and of this section) except for the provisions of Part 6.

Lithium metal cells or batteries shipped in accordance with the provisions of Section IB must be described on a dangerous goods transport document as set in Part 5;4. The packing instruction number "968" required by 5;4.1.5.8.1 a) must be supplemented with "IB". All other applicable provisions of Part 5;4 apply.

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for lithium metal cells, the lithium content is not more than 1 g;
- 2) for lithium metal or lithium alloy batteries, the aggregate lithium content is not more than 2 g.

IB.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-IB

<i>Contents</i>	<i>Net quantity per package</i>	
	<i>Passenger</i>	<i>Cargo</i>
Lithium metal cells and batteries	Forbidden	2.5 kg

IB.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery then placed in a strong rigid outer packaging.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

- Cells and batteries must not be packed in the same outer packaging with substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).

UN Model Regulations, Chapter 3.3, Special Provision 188 (d) (see ST/SG/AC.10/44/Add.1)

- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with **electrically** conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3) in addition to the appropriate Class 9 hazard label (Figure 5-26) and the cargo aircraft only label (Figure 5-28).

Note.— The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5;3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.

IB.3 Outer packagings

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II. SECTION II

Lithium metal or lithium alloy cells and batteries, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General — Transport of dangerous goods by post);
- Part 5;1.1 g) and j) (Shipper's responsibilities — General requirements);

DGP-WG/16-WP/54 (see paragraph 3.5.3.10) (incorporated in 2017-2018 Edition through Addendum/Corrigendum No. 1):

-
- Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);
 - Part 7;2.1 (Operator's responsibilities — Loading restrictions on the flight deck and for passenger aircraft);
 - Part 7;2.4.1 (Operator's responsibilities — Loading of cargo aircraft);
 - Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
 - Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
 - Paragraphs 1 and 2 of this packing instruction.

Lithium metal or lithium alloy cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Table 968-II

Contents	Lithium metal cells and/or batteries with a lithium content not more than 0.3 g	Lithium metal cells with a lithium content more than 0.3 g but not more than 1 g	Lithium metal batteries with a lithium content more than 0.3 g but not more than 2 g
1	2	3	4
Maximum number of cells / batteries per package	No limit	8 cells	2 batteries
Maximum net quantity (mass) per package	2.5 kg	n/a	n/a

The limits specified in columns 2, 3 and 4 of Table 968-II must not be combined in the same package.

II.2 Additional requirements

- Cells and batteries must be packed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

- ~~Cells and batteries must not be packed in the same outer packaging with other dangerous goods.~~

UN Model Regulations, Chapter 3.3, Special Provision 188 (d) (see ST/SG/AC.10/44/Add.1)

- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with **electrically** conductive materials within the same packaging that could lead to a short circuit.
- Each package must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3) and the cargo aircraft only label (Figure 5-28).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
 - the cargo aircraft only label must be located on the same surface of the package near the lithium battery mark, if the package dimensions are adequate.

Note. The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5;3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.

- A shipper is not permitted to offer for transport more than one package prepared according to this section in any single consignment.
- The words "lithium metal batteries, in compliance with Section II of PI968 — cargo aircraft only" or "lithium metal batteries, in compliance with Section II of PI968 — CAO" must be placed on the air waybill, when an air waybill is used.
- Packages and overpacks of lithium metal batteries prepared in accordance with the provisions of Section II must be offered to the operator separately from cargo which is not subject to these Instructions and must not be loaded into a unit load device before being offered to the operator.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

II.4 Overpacks

Not more than one package prepared in accordance with this section may be placed into an overpack.

DGP-WG/17-WP/6 (see paragraph 3.5.3.1 of this report):

Packages prepared in accordance with this section must not be placed into an overpack with packages containing substances and articles of Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).

UN Model Regulations, Chapter 3.3, Special Provision 188 f) (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider replacing “affixed” with “reproduced” for the sake of alignment with the UN Model Regulations and to consider the editorial amendments made to the new text in the Model Regulation with respect to the height of the overpack marking (aligns with similar provisions elsewhere in the Technical Instructions).

When the package is placed in an overpack, the lithium battery mark (Figure 5-3) and the cargo aircraft only label (Figure 5-28) required by this packing instruction must either be clearly visible or the mark and label must be ~~affixed~~ reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Note.— For the purpose of Section II, an overpack is an enclosure used by a single shipper that contains no more than one package prepared in accordance with this section. For shipments prepared in accordance with Section IA and/or IB, this limit of one package of Section II batteries per overpack still applies.

Packing Instruction 969

Passenger and cargo aircraft for UN 3091 (packed with equipment) only

1. Introduction

This entry applies to lithium metal or lithium alloy batteries packed with equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN Manual of Tests and Criteria is considered a “cell” and must be transported according to the requirements for “cells” for the purpose of this packing instruction.

For the purpose of this packing instruction, “equipment” means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. Lithium batteries forbidden from transport

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

I. SECTION I

Each cell or battery must meet all the provisions of 2.9.3.

Packing Instruction 969

I.1 General requirements

Part 4;1 requirements must be met.

UN number and proper shipping name	Package quantity (Section I)	
	Passenger	Cargo
UN 3091 Lithium metal batteries packed with equipment	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

I.2 Additional requirements

- Lithium metal cells and batteries must be protected against short circuits.
- Lithium metal cells or batteries must:
 - be placed in inner packagings that completely enclose the cell or battery, then placed in an outer packaging. The completed package for the cells or batteries must meet the Packing Group II performance requirements; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with equipment in a packaging that meets the Packing Group II performance requirements.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- For lithium metal cells and batteries prepared for transport on passenger aircraft as Class 9:
 - cells and batteries offered for transport on passenger aircraft must be packed in intermediate or outer rigid metal packaging surrounded by cushioning material that is non-combustible and non-conductive and placed inside an outer packaging.

I.3 Outer packagings

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

II. SECTION II

Lithium metal or lithium alloy cells and batteries packed with equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

- Part 1;2.3 (General — Transport of dangerous goods by post);

DGP-WG/16-WP/54 (see paragraph 3.5.3.10) (incorporated in 2017-2018 Edition through Addendum/Corrigendum No. 1):

-
- **Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);**
 - Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
 - Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
 - Paragraphs 1 and 2 of this packing instruction.

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

Packing Instruction 969

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

II.1 General requirements

Cells and batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	Package quantity (Section II)	
	Passenger	Cargo
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

II.2 Additional requirements

DGP-WG/16-WP/54 (see paragraph 3.5.3.11):

- Lithium metal cells ~~or~~ **and** batteries must:
 - be placed in inner packagings that completely enclose the cell or battery, then placed in a strong rigid outer packaging; or
 - be placed in inner packagings that completely enclose the cell or battery, then placed with the equipment in a strong rigid outer packaging.
-

UN Model Regulations, Chapter 3.3, Special Provision 188 (d) (see ST/SG/AC.10/44/Add.1)

- Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with **electrically** conductive materials within the same packaging that could lead to a short circuit.
- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- The number of cells or batteries in each package must not exceed the appropriate number for the equipment's operation, plus two spares.
- Each package of cells or batteries, or the completed package, must be capable of withstanding a 1.2 m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3).
 - the package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.

~~*Note. The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5;3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.*~~

- The words "lithium metal batteries, in compliance with Section II of PI969" must be placed on the air waybill, when an air waybill is used.
- Where a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment that meet the limits for lithium cells or batteries of Section II, the following additional requirements apply:
 - the shipper must ensure that all applicable parts of both packing instructions are met. The total mass of lithium batteries contained in any package must not exceed 5 kg;
 - the words "lithium metal batteries, in compliance with Section II of PI969" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

Packing Instruction 969

II.3 Outer packagings

<i>Boxes</i>	<i>Drums</i>	<i>Jerricans</i>
Aluminium	Aluminium	Aluminium
Fibreboard	Fibre	Plastics
Natural wood	Other metal	Steel
Other metal	Plastics	
Plastics	Plywood	
Plywood	Steel	
Reconstituted wood		
Steel		

II.4 Overpacks

UN Model Regulations, Chapter 3.3, Special Provision 188 f) (see ST/SG/AC.10/44/Add.1)

DGP is invited to consider replacing “affixed” with “reproduced” for the sake of alignment with the UN Model Regulations and to consider the editorial amendments made to the new text in the Model Regulation with respect to the height of the overpack marking (aligns with similar provisions elsewhere in the Technical Instructions).

When packages are placed in an overpack, the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be ~~affixed~~ reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

Packing Instruction 970

Passenger and cargo aircraft for UN 3091 (contained in equipment) only

1. Introduction

This entry applies to lithium metal or lithium alloy batteries contained in equipment.

Section I of this packing instruction applies to lithium metal and lithium alloy cells and batteries that are assigned to Class 9. Certain lithium metal and lithium alloy cells and batteries offered for transport and meeting the requirements of Section II of this packing instruction, subject to paragraph 2 below, are not subject to other additional requirements of these Instructions.

A single cell battery as defined in Part III, sub-section 38.3.2.3 of the UN *Manual of Tests and Criteria* is considered a “cell” and must be transported according to the requirements for “cells” for the purpose of this packing instruction.

For the purpose of this packing instruction, “equipment” means apparatus for which the lithium cells or batteries will provide electrical power for its operation.

2. Lithium batteries forbidden from transport

The following applies to all lithium metal cells and batteries in this packing instruction:

Cells and batteries, identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons).

Packing Instruction 970

I. SECTION I

Each cell or battery must meet all the provisions of 2;9.3.

DGP-WG/16-WP/54 (see paragraph 3.5.3.11):

I.1 General requirements

Equipment must be packed in strong ~~rigid~~ outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

UN number and proper shipping name	Package quantity (Section I)	
	Passenger	Cargo
UN 3091 Lithium metal batteries contained in equipment	5 kg of lithium metal cells or batteries	35 kg of lithium metal cells or batteries

I.2 Additional requirements

— The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.

DGP-WG/16-WP/54 (see paragraph 3.5.3.11):

- The equipment must be packed in strong **rigid** outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- The quantity of lithium metal contained in any piece of equipment must not exceed 12 g per cell and 500 g per battery.

I.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

II. SECTION II

Error discovered and corrected through Addendum/Corrigendum No. 1 to 2017-2018 Edition):

Lithium metal or lithium alloy cells and batteries contained ~~with in~~ equipment, when complying with Section II of this packing instruction, are only subject to the following additional provisions of these Instructions:

— Part 1;2.3 (General — Transport of dangerous goods by post);

DGP-WG/16-WP/54 (see paragraph 3.5.3.10) (incorporated in 2017-2018 Edition through Addendum/Corrigendum No. 1):

- **Part 5;2.4.16 (Shipper's responsibilities — Special marking requirements for lithium batteries);**
- Part 7;4.4 (Operator's responsibilities — Reporting of dangerous goods accidents and incidents);
- Part 8;1.1 (Provisions concerning passengers and crew — Dangerous goods carried by passengers or crew); and
- Paragraphs 1 and 2 of this packing instruction.

Packing Instruction 970

Lithium metal cells and batteries may be offered for transport provided that each cell and battery meets the provisions of 2;9.3.1 a) and e) and the following:

- 1) for a lithium metal cell, the lithium content is not more than 1 g;
- 2) for a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. When active, these devices must meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems. The devices must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport.

II.1 General requirements

DGP-WG/16-WP/54 (see paragraph 3.5.3.10)

Equipment containing batteries must be packed in strong outer packagings that conform to Part 4;1.1.1, 1.1.3.1 and 1.1.10 (except 1.1.10.1).

Contents	Package quantity (Section II)	
	Passenger	Cargo
Net quantity of lithium metal cells or batteries per package	5 kg	5 kg

II.2 Additional requirements

- The equipment must be secured against movement within the outer packaging and must be equipped with an effective means of preventing accidental activation.
- Cells and batteries must be protected so as to prevent short circuits.
- The equipment must be packed in strong rigid outer packagings constructed of suitable material of adequate strength and design in relation to the packaging's capacity and its intended use unless the battery is afforded equivalent protection by the equipment in which it is contained.
- Each package must be marked with the appropriate lithium battery mark (Figure 5-3). The package must be of such size that there is adequate space to affix the mark on one side without the mark being folded.
 - This requirement does not apply to:
 - packages containing only button cell batteries installed in equipment (including circuit boards); and
 - packages containing no more than four cells or two batteries installed in equipment, where there are not more than two packages in the consignment.

Note. — The provisions for a lithium battery handling label as contained in the 2015-2016 Edition of these Instructions (Part 5;3.5.2 and Figure 5-32 of the 2015-2016 Edition) may continue to be used in lieu of the lithium battery mark until 31 December 2018.

- Where a consignment includes packages bearing the lithium battery mark, the words "lithium metal batteries, in compliance with Section II of PI970" must be placed on the air waybill, when an air waybill is used.
- Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.

II.3 Outer packagings

Boxes

Aluminium
Fibreboard
Natural wood
Other metal
Plastics
Plywood
Reconstituted wood
Steel

Drums

Aluminium
Fibre
Other metal
Plastics
Plywood
Steel

Jerricans

Aluminium
Plastics
Steel

Packing Instruction 970

UN Model Regulations, Chapter 3.3, Special Provision 188 f) (see ST/SG/AC.10/44/Add.1)
DGP is invited to consider replacing “affixed” with “reproduced” for the sake of alignment with the UN Model Regulations and to consider the editorial amendments made to the new text in the Model Regulation with respect to the height of the overpack marking (aligns with similar provisions elsewhere in the Technical Instructions).

II.4 Overpacks

When packages are placed in an overpack, the lithium battery mark (Figure 5-3) required by this packing instruction must either be clearly visible or the mark must be ~~affixed~~ reproduced on the outside of the overpack and the overpack must be marked with the word “Overpack” in lettering of at least 12 mm high.

...

Part 5

SHIPPER’S RESPONSIBILITIES

Chapter 1

GENERAL

...

1.1 GENERAL REQUIREMENTS

Before a person offers any package or overpack of dangerous goods for transport by air, that person must ensure that:

...

Note 1.— Packages and overpacks containing dangerous goods may be included on the same air waybill as cargo which is not subject to these Instructions.

Note 2.— The requirement in 1.1 j) also applies to consolidated shipments offered to the operator.

Note 3.— For cooling purposes, an overpack may contain dry ice, provided that the overpack meets the requirements of Packing Instruction 954.

UN Model Regulations, 5.1.1 (see ST/SG/AC.10/44/Add.1)

Note 4.— In accordance with the GHS, a GHS pictogram not required by these Instructions should only appear in transport as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).

ICAO translators and editors of versions other than English: There may be a need for amendment to 5.1.6.2 for the sake of alignment with 4.1.1.11 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

1.6 EMPTY PACKAGINGS

...

1.6.2 Before an empty packaging which had previously contained an infectious substance is returned to the shipper, or sent elsewhere, it must be disinfected or sterilized to nullify any hazard, and any label or mark indicating that it had contained an infectious substance must be removed or obliterated.

...

1.7 MIXED PACKING

UN Model Regulations, 5.1.4 (see ST/SG/AC.10/44/Add.1)

When two or more dangerous goods are packed within the same outer packaging, the package must be labelled and marked as required for each substance. Labels need not be applied for a subsidiary-risk hazard if the hazard is already represented by a primary-risk hazard label.

...

Chapter 3

LABELLING

...

UN Model Regulations, 5.2 (see ST/SG/AC.10/44/Add.1)

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. A subsidiary-risk hazard label must also be affixed for any hazard indicated by a class or division number in column 4 of Table 3-1. However, special provisions indicated in column 7 may also require a subsidiary-risk hazard label where no subsidiary-risk hazard is indicated in column 4 or may exempt from the requirement for a subsidiary-risk hazard label where such a hazard is indicated in the Dangerous Goods List.

3.1.2 Labels identifying the primary and subsidiary-risk hazards of the dangerous goods must bear the class or division number as required in 3.5.1.

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.

3.2.2 Packages containing substances of Class 8 need not show a subsidiary-risk hazard label for Division 6.1 if the toxicity arises solely from the destructive effect on tissue. Substances of Division 4.2 need not show a subsidiary-risk hazard label for Division 4.1 if the substance is also a flammable solid.

3.2.3 Packages containing organic peroxides which meet the criteria for Class 8, Packing Group I or II must be labelled with a corrosive subsidiary-risk hazard label.

Note.— Many liquid organic peroxide formulations are flammable; however, no subsidiary-risk hazard flammable label is required because the organic peroxide label itself is considered to imply that the product may be flammable.

...

3.2.8 Except as provided in 3.5.1.1 b), each class hazard 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 mark, 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 mark;
- d) when primary and subsidiary ~~risk~~ hazard labels are required, be displayed next to each other; and
- e) be affixed at an angle of 45° (diamond shaped), unless the package dimensions are inadequate.

...

3.5.1 Class hazard label specifications

3.5.1.1 Labels must satisfy the provisions of this section and conform, in terms of colour, symbols and general format, to the specimen labels shown in Figures 5-4 to 5-26.

Note.— Where appropriate, labels in Figures 5-4 to 5-26 are shown with a dotted outer boundary as provided for in 3.5.1.1 a). This is not required when the label is applied on a background of contrasting colour.

Class hazard labels must conform to the following specifications:

...

UN Model Regulations, 5.2.2.2.1.2 (see ST/SG/AC.10/44/Add.1)

- b) Cylinders for Class 2 may, on account of their shape, orientation and securing mechanisms for transport, bear labels representative of those specified in this chapter, which have been reduced in size, according to ISO 7225:2005 "Gas cylinders — Precautionary labels", for display on the non-cylindrical part (shoulder) of such cylinders. Labels may overlap to the extent provided for by ISO 7225:2005 "Gas cylinders — Precautionary labels"; however, in all cases the labels representing the primary hazard and the numbers appearing on any label must remain fully visible and the symbols recognizable.

Corrigendum 1 to UN Model Regulations, Chapter 5.2, 5.2.2.2.1.3, see ST/SG/AC.10/1/Rev.19/Corr.1)

ICAO translators and editors of versions other than English: There may be a need for amendment to 3.5.1.1 c) for the sake of alignment with 5.2.2.2.1.3 of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

- c) With the exception of labels for Divisions 1.4, 1.5 and 1.6 of Class 1, the upper half of the label must contain the pictorial symbol and the lower half must contain the class or, in the case of labels for Class 5, the division number, as appropriate. ~~The lower half of the label must also contain the pictorial symbol on the Class 9 label for lithium batteries (Figure 5-26).~~ However for the Class 9 label for lithium batteries (Figure 5-26), the upper half of the label must only contain the seven vertical stripes of the symbol and the lower half must contain the group of batteries of the symbol and the class number. Except for the Class 9 label for lithium batteries (Figure 5-26), the label may include such text as the UN number, or words describing the hazard class (e.g. "flammable") in accordance with 3.5.1.1 e) provided that the text does not obscure or detract from the other required label elements.

...

UN Model Regulations, 5.2 (see ST/SG/AC.10/44/Add.1)

The text highlighted below is not in alignment with the UN Model Regulations (5.2.2.2.1.5), which refer to the “class mark”.

- e) On labels other than those for material of Class 7, the insertion of any text (other than the class or division number or compatibility group) in the space below the symbol must be confined to particulars indicating the nature of the ~~risk~~ **hazard** and precautions to be taken in handling. In the case of the Class 9 label for lithium batteries (Figure 5-26), no text other than **the class number** must be included in the bottom part of the label.

...

3.5.1.2 Illustrations of the class hazard labels, showing the approved symbols and colours, are given in Figures 5-5 to 5-26. 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~~ **hazard**. See Figures 5-5 to 5-8 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 labels may extend to the edge of the label or there may be some white space at the edge, etc.

UN Model Regulations, 5.2.2.2.2 (see ST/SG/AC.10/44/Add.1) and paragraph 3.2.5.1.3 of this report.

DGP-WG/17 decided not to align the display of hazards labels with the new format in the Model Regulations.

...

UN Model Regulations, 5.2.2.1.13 (see ST/SG/AC.10/44/Add.1) and paragraph 3.2.2.1.3 of this report

DGP-WG/17 was invited to consider inclusion of these new provisions for articles, n.o.s and particularly whether it is appropriate to include the provisions for lithium batteries in articles for the air mode, recognizing the potential for additional complexity and risk.

A dedicated working group at DGP-WG/17 proposed that these articles should be forbidden from transport by air under normal circumstances unless approval was granted by the State of Origin and the State of the Operator in accordance with Special Provision A2. An ad hoc group will develop provisions for inclusion in the DGP/26 working paper on UN harmonization (see paragraph 3.2.2.1.3 of this report).

The group will also consider where these provisions should be located. They were proposed here as opposed to before the label specifications in 5;3.5.1, as is done in the Model Regulations, so as to avoid the need for consequential changes to the many references to the label specifications.

3.6 Labels for articles containing dangerous goods transported as UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548

3.6.1 Packages containing dangerous goods in articles and dangerous goods in articles transported unpackaged must bear labels according to 3.1.1 reflecting the hazards established according to Part 2, Introductory Chapter, paragraph 6. If the article contains one or more lithium batteries with, for lithium metal batteries, an aggregate lithium content of 2 g or less, and for lithium ion batteries, a Watt-hour rating of 100 Wh or less, the lithium battery mark (Figure 5-3) must be affixed to the package or unpackaged article. If the article contains one or more lithium batteries with, for lithium metal batteries, an

aggregate lithium content of more than 2 g and for lithium ion batteries, a Watt-hour rating of more than 100 Wh, the lithium battery label (Figure 5-26) must be affixed to the package or unpackaged article.

DGP is invited to consider whether the following should be replaced with text used elsewhere in the Technical Instructions, i.e. “When required by the provisions of 4;1.1.13, either the “Package orientation” label (Figure 5-29), or preprinted package orientation labels meeting the same specification as either Figure 5-29 or ISO Standard 780:1997, must be affixed to or printed on at least two opposite vertical sides of the package with the arrows pointing in the correct direction.”

3.6.2 When it is required to ensure articles containing liquid dangerous goods remain in their intended orientation, orientation marks meeting the requirements of 4;1.1.13 must be affixed and visible on at least two opposite vertical sides of the package or of the unpackaged article where possible, with the arrows pointing in the correct upright direction.

Renumber subsequent paragraphs accordingly

...

Chapter 4

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 or ID number preceded by the letters “UN” or “ID” as appropriate;
- b) the proper shipping name, as determined according to 3;1.2, including the technical name enclosed in parenthesis, as applicable (see 3;1.2.7);

ICAO translators and editors of versions other than English: There may be a need for amendment to 4.1.4 c) for the sake of alignment with 5.4.1.4.1 c) of the UN Model Regulations (see ST/SG/AC.10/44/Add.1)

- c) the primary hazard class or, when assigned, the division of the goods, including for Class 1 the compatibility group letter. The words “Class” or “Division” may be included preceding the primary hazard class or division numbers;

UN Model Regulations, 5.4.1.4.1 (d) (see ST/SG/AC.10/44/Add.1)

- d) subsidiary hazard class or division number(s) corresponding to the subsidiary-risk hazard label(s) required to be applied, when assigned, must be entered following the primary hazard class or division and must be enclosed in parenthesis. The words “Class” or “Division” may be included preceding the subsidiary hazard class or division numbers;
- e) where assigned, the packing group for the substance or article which may be preceded by “PG” (e.g. “PG II”).

+ *Note. — Until 31 March 2017, shippers may identify engines as Class 9, UN 3166 using the proper shipping names and Packing Instruction 950 or 951 as shown in the 2015-2016 Edition of these Instructions. In that instance the dangerous goods transport document must indicate the packing instruction number and the UN number and proper shipping name in effect in the 2015-2016 Edition of these Instructions. The marks and labels applied, when required, must be consistent with the information shown on the dangerous goods transport document.*

...

UN Model Regulations, 5.4.1.5.5 (see ST/SG/AC.10/44/Add.1)

Did not include amendment to heading which includes reference to “polymerizing substances” in the Technical Instructions as there is no reference to polymerizing substances in 4.1.5.4.1 or 4.1.5.4.2 (the UN Model Regulations include provisions for temperature control which are not included in the Technical Instructions).

4.1.5.4 *Self-reactive substances and organic peroxides*

4.1.5.4.1 When organic peroxides and self-reactive substances are transported under conditions where approval is required (for organic peroxides, see 2;5.3.2.5 for self-reactive substances, see 2;4.2.3.2.5), a statement to this effect must be included in the dangerous goods transport document. A copy of the classification approval and conditions of transport for non-listed organic peroxides and self-reactive substances must be attached to the dangerous goods transport document.

4.1.5.4.2 When a sample of an organic peroxide (see 2;5.3.2.6) or a self-reactive substance (see 2;4.2.3.2.6) is transported, a statement to this effect must be included in the dangerous goods transport document.

4.1.5.6 *Firework classification reference*

4.1.5.6.1 When fireworks of UN 0336 or UN 0337 are transported, the dangerous goods transport document must include a classification reference(s) issued by the appropriate national authority.

UN Model Regulations, 5.4.1.5.10 (see ST/SG/AC.10/44/Add.1)

4.1.5.6.2 The classification reference(s) must consist of the appropriate national authority's State, indicated by the distinguishing sign ~~for motor~~ **used on** vehicles in international traffic, the appropriate national authority identification and a unique serial reference. Examples of such classification references are:

GB/HSE123456
D/BAM1234
USA EX20091234.

Note.— The distinguishing sign used on vehicles in international traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

Part 6

PACKAGING NOMENCLATURE, MARKING, REQUIREMENTS AND TESTS

...

Chapter 2

MARKING OF PACKAGINGS OTHER THAN INNER PACKAGINGS

Introductory Notes

Note 1.— The marks indicate that the packaging which bears them corresponds to a successfully tested design type and that it complies with the provisions of Chapters 3 and 4 which are related to the manufacture, but not to the use, of the packaging. In itself, therefore, the marks do not necessarily confirm that the packaging may be used for any particular substance.

Note 2.— The marks are intended to be of assistance to packaging manufacturers, reconditioners, packaging users, operators and appropriate authorities. In relation to the use of a new packaging, the original marks are a means for its manufacturer(s) to identify the type and to indicate those performance test regulations that have been met.

ICAO translators and editors of versions other than English: There may be a need for amendment to Note 3 for the sake of alignment with 6.1.3, Note 3 of the UN Model Regulations (see [ST/SG/AC.10/44/Add.1](#))

Note 3.— The marks do not always provide full details of the test levels, etc., and these may need to be taken further into account, e.g. by reference to a test certificate, test reports or register of successfully tested packagings. For example, a packaging having an X or Y mark may be used for substances to which a packing group having a lesser degree of danger has been assigned with the relevant maximum permissible value of the relative density, determined by taking into account the factor 1.5 or 2.25 indicated in the test requirements for packagings in Chapter 4 as appropriate, i.e. a Packing Group I packaging tested for products with a relative density of 1.2 could be used as a Packing Group II packaging for products with a relative density of 1.8 or a Packing Group III packaging for products with a relative density of 2.7, provided of course that all the performance criteria can still be met with the higher relative density.

2.1 MARKING REQUIREMENTS FOR PACKAGINGS OTHER THAN INNER PACKAGINGS

2.1.1 Each packaging intended for use according to these Instructions must bear marks which are durable, legible and placed in a location and of such a size relative to the packaging as to be readily visible. For packages with a gross mass of more than 30 kg the marks, or a duplicate thereof, must appear on the top or on a side of the packaging. Letters, numerals and symbols must be at least 12 mm high, except for packagings of 30 L or 30 kg capacity or less, when they must be at least 6 mm in height and for packagings of 5 L or 5 kg or less when they must be of an appropriate size. The marks must show:

...

 UN Model Regulations, 6.1.3.1 f) (see ST/SG/AC.10/44/Add.1)

- f) the State authorizing the allocation of the mark, indicated by the distinguishing sign ~~for motor~~ used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

 UN Model Regulations, 6.1.3.8 (h) (see ST/SG/AC.10/44/Add.1)

2.1.8 After reconditioning a packaging, the reconditioner must apply to it, in sequence, durable marks showing:

- h) the State in which the reconditioning was carried out, indicated by the distinguishing sign ~~for motor~~ used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

Chapter 4

PACKAGING PERFORMANCE TESTS

...

4.7 TEST REPORT

4.7.1 A test report containing at least the following particulars must be drawn up and must be available to the users of the packaging:

- a) name and address of the test facility;
- b) name and address of the applicant (where appropriate);
- c) a unique test report identification;
- d) date of the test report;
- e) manufacturer of the packaging;
- f) description of the packaging type (e.g. dimensions, materials, closures, thickness, etc.), including method of manufacture (e.g. blow moulding); drawings and/or photographs may be included;
- g) maximum capacity;

 UN Model Regulations, 6.1.5.7.1 (see ST/SG/AC.10/44/Add.1)

- h) characteristics of the test contents (e.g. the viscosity and relative density for liquids and the particle size for solids) (for plastics packagings subject to the internal pressure test in 4.5, the temperature of the water used);
- i) test descriptions and results;
- j) a signature and name and status of the signatory.

...

Chapter 5

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

...

5.1.6 Periodic inspection and testing

5.1.6.1 Refillable cylinders other than cryogenic receptacles 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 marks;
- b) check of the internal conditions of the cylinder (e.g. internal inspection, verification of minimum wall thickness);
- c) check of the threads if there is evidence of corrosion or if the fittings are removed;
- d) a hydraulic pressure test and, if necessary, verification of the characteristics of the material by suitable tests;

UN Model Regulations, 6.2.1.6.1 d) (see ST/SG/AC.10/44/Add.1)

“and tubes” is struck out below since they are not permitted for transport by air (reference to tubes was excluded from the existing text as well).

Note 1.— With the agreement of the appropriate national authority, the hydraulic pressure test may be replaced by a test using a gas, where such an operation does not entail any danger.

Note 2.— ~~With the agreement of the appropriate national authority, the hydraulic pressure test of cylinders may be replaced by an equivalent method based on acoustic emission testing or a combination of acoustic emission testing and ultrasound examination. ISO 16148:2006 may be used as a guide for acoustic emission testing procedures. For seamless steel cylinders and tubes the check of 5.1.6.1 b) and hydraulic pressure test of 5.1.6.1 d) may be replaced by a procedure conforming to ISO 16148:2016 “Gas cylinders — Refillable seamless steel gas cylinders and tubes — Acoustic emission examination (AT) and follow-up ultrasonic examination (UT) for periodic inspection and testing”.~~

Note 3.— The check of 5.1.6.1 b) and the hydraulic pressure test of 5.1.6.1 d) may be replaced by ultrasonic examination carried out in accordance with ISO 10461:2005 + A1:2006 for seamless aluminium alloy gas cylinders and in accordance with ISO 6406:2005 for seamless steel gas cylinders.

- e) check of service equipment, other accessories and pressure-relief devices, if to be reintroduced into service.

...

5.2 REQUIREMENTS FOR UN CYLINDERS AND CLOSED CRYOGENIC RECEPTACLES

...

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:

<i>Reference</i>	<i>Title</i>	<i>Applicable for manufacture</i>
...		
+ ISO-ISO 7866: 2012+ Cor 1:2014	Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing	Until further notice
	<i>Note.— Aluminium alloy 6351A or equivalent must not be used.</i>	
...		

 UN Model Regulations, 6.2.2.1.1 (see ST/SG/AC.10/44/Add.1)

ISO 11118:1999	Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods.	Until further notice
<u>ISO 11118:2015</u>	<u>Gas cylinders — Non-refillable metallic gas cylinders — Specification and test methods</u>	<u>Until 31 December 2020</u>
...		

...

...

 UN Model Regulations, 6.2.2.1.8 (see ST/SG/AC.10/44/Add.1)

5.2.1.8 Not used.

...

5.2.3 Service equipment

The following standards apply to closures and their protection:

<i>Reference</i>	<i>Title</i>	<i>Applicable for manufacture</i>
ISO 11117:1998	Gas cylinders — Valve protection caps and valve guards for industrial and medical gas cylinders — Design, construction and tests.	Until 31 December 2014
ISO 11117:2008+ Cor 1:2009	Gas cylinders — Valve protection caps and valve guards — Design, construction and tests.	Until further notice
ISO 10297:1999	Gas cylinders — Refillable gas cylinder valves — Specification and type testing.	Until 31 December 2008
ISO 10297:2006	Gas cylinders — Refillable gas cylinder valves — Specification and type testing.	Until 31 December 2020
ISO 10297:2014	Gas cylinders — Cylinder valves — Specification and type testing	Until further notice

 UN Model Regulations, 6.2.2.3 (see ST/SG/AC.10/44/Add.1)

ISO 13340:2001	Transportable gas cylinders — Cylinder valves for non-refillable cylinders — Specification and prototype testing.	Until further notice
		<u>Until 31 December 2020</u>

ISO 14246:2014	Gas cylinders — Cylinder valves — Manufacturing tests and examination	Until further notice
ISO 17871:2015	Gas cylinders — Quick-release cylinders valves- Specification and type testing	Until further notice

...

5.2.4 Periodic inspection and test

UN Model Regulations, 6.2.2.4 (see ST/SG/AC.10/44/Add.1)

5.2.4.1 The following standards apply to the periodic inspection and testing of UN cylinders and UN metal hydride storage systems and their closures:

Reference	Title	Applicable for manufacture
ISO 6406:2005	Seamless steel gas cylinders — Periodic inspection and testing.	Until further notice
ISO 10460:2005	Gas cylinders – Welded carbon-steel gas cylinders – Periodic inspection and testing.	Until further notice
	<i>Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.</i>	
ISO 10461:2005/A1:2006	Seamless aluminium-alloy gas cylinders — Periodic inspection and testing.	Until further notice
ISO 10462:2005	Transportable cylinders for dissolved acetylene — Periodic inspection and maintenance.	Until 31 December 2018
ISO 10462:2013	Gas cylinders — Acetylene cylinders — Periodic inspection and maintenance.	Until further notice
ISO 11513:2011	Gas cylinders — Refillable welded steel cylinders containing materials for sub-atmospheric gas packaging (excluding acetylene) — Design, construction, testing, use and periodic inspection.	Until further notice
ISO 11623:2002	Transportable gas cylinders — Periodic inspection and testing of composite gas cylinders.	Until further notice
ISO 11623:2015	Gas cylinders — Composite construction — Periodic inspection and testing	Until further notice <u>December 2020</u>
ISO 22434:2006	Transportable gas cylinders — Inspection and maintenance of cylinder valves	Until further notice
	<i>Note.— These requirements may be met at times other than at the periodic inspection and test of UN cylinders.</i>	

5.2.4.2 The following standard applies to the periodic inspection and testing of UN metal hydride storage systems:

ISO 16111:2008	Transportable gas storage devices — Hydrogen absorbed in reversible metal hydride.	Until further notice
----------------	------------------------------------------------------------------------------------	----------------------

Editorial amendment (redundant text, it appears under 5.2.4.1, ISO 10460:2005)

~~*Note.— The repair of welds described in clause 12.1 of this standard must not be permitted. Repairs described in clause 12.2 require the approval of the appropriate national authority which approved the periodic inspection and test body in accordance with 5.2.6.*~~

...

5.2.7 Marking of UN refillable cylinders and closed cryogenic receptacles

...

UN Model Regulations, 6.2.2.7.2 (c) (see ST/SG/AC.10/44/Add.1)

- c) The character(s) identifying the country of approval, as indicated by the distinguishing signs of motor vehicles in international road traffic; used on

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

UN Model Regulations, 6.2.2.7.4 (see ST/SG/AC.10/44/Add.1)

5.2.7.4 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;

Note.— Information on marks that may be used for identifying threads for cylinders is given in ISO/TR 11364, Gas cylinders — Compilation of national and international valve stem/gas cylinder neck threads and their identification and marking system.

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 road traffic. The country mark and the manufacturer's mark must be separated by a space or slash;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

5.2.7.5 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 5.2.7.4 except for the marks described in 5.2.7.4 q) and r) which must be adjacent to the periodic inspection and test marks of 5.2.7.8;
- The operational marks in 5.2.7.3 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 5.2.7.2.

The following is an example of marking a cylinder:

m) 25E	n) D MF	o) 765432	p) H	
i) PW200PH	f) 300BAR	g) 62.1KG	j) 50L	h) 5.8MM
 a)	b) ISO 9809-1	c) F	d) IB	e) 2000/12

5.2.7.6 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.

DGP is invited to consider deleting 5.2.7.7 and renumbering subsequent paragraphs as shown below as requirements for composite cylinders are included in 5.2.7.4 q) and r)

~~5.2.7.7 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).~~

5.2.7.8.7 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:

UN Model Regulations, 6.2.2.7.7 (a) (see ST/SG/AC.10/44/Add.1)

Reference to distinguishing signs for motor vehicles is included in the 19th revised edition of the Model Regulations but not the 2017-2018 Edition of the Technical Instructions. It is added here as amended for the 20th revised edition.

- a) the character(s) identifying the country authorizing the body performing the periodic inspection and test as indicated by the distinguishing sign used on vehicles in international road traffic. This mark is not required if this body is approved by the appropriate national authority of the country approving manufacture;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- 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.

5.2.7-9.8 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 be removed only by disconnecting the valve from the cylinder.

...

5.2.9 Marking of UN metal hydride storage systems

...

5.2.9.2 The following marks must be applied:

- a) The UN packaging symbol 

This symbol must not be used for any purpose other than for certifying that a packaging complies with the relevant requirements in Chapters 1 to 6;

- b) "ISO 16111" (the technical standard used for design, manufacture and testing);

UN Model Regulations, 6.2.2.9.2 (c) (see ST/SG/AC.10/44/Add.1)

- c) The character(s) identifying the country of approval, as indicated by the distinguishing signs ~~of motor~~ used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

UN Model Regulations, 6.2.2.9.2 (h) (see ST/SG/AC.10/44/Add.1)

- h) The manufacturer's mark registered by the appropriate national authority. When the country of manufacture is not the same as the country of approval, then the manufacturer's mark must be preceded by the character(s) identifying the country of manufacture, as indicated by the distinguishing signs ~~of motor~~ used on vehicles in international road traffic. The country mark and the manufacturer's mark must be separated by a space or slash;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

UN Model Regulations, 6.2.2.9.4 (a) (see ST/SG/AC.10/44/Add.1)

5.2.9.4 In addition to the preceding marks, each metal hydride storage system that meets the periodic inspection and test requirements of 5.2.4 must be marked indicating:

- a) the character(s) identifying the country authorizing the body performing the periodic inspection and test, as indicated by the distinguishing sign ~~of motor~~ used for vehicles in international road traffic. This mark is not required if this body is approved by the appropriate national authority of the country approving manufacture;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

...

Chapter 6

PACKAGINGS FOR INFECTIOUS SUBSTANCES OF CATEGORY A

...

6.4 MARKING

...

6.4.2 A packaging that meets the requirements of this section and of 6.5 shall be marked with:

...

UN Model Regulations, 6.3.4.2 (e) (see ST/SG/AC.10/44/Add.1)

- e) the State authorizing the allocation of the mark, indicated by the distinguishing sign ~~for motor~~ used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- f) the name of the manufacturer or other identification of the packaging specified by the competent authority; and
g) for packagings meeting the requirements of 6.5.1.6, the letter “U”, inserted immediately following the mark required in b) above.

...

Chapter 8

REQUIREMENTS FOR INTERMEDIATE BULK CONTAINERS

8.1 MARKING OF PACKAGING FOR INTERMEDIATE BULK CONTAINERS

...

8.1.2 The packaging mark consists of:

UN Model Regulations, 6.5.2.1 (e) (see ST/SG/AC.10/44/Add.1)

- e) the State authorizing the allocation of the mark; indicated by the distinguishing sign ~~for motor~~ used on vehicles in international road traffic;

Note.— The distinguishing sign used on vehicles in international road traffic is the distinguishing sign of the State of registration used on motor vehicles and trailers in international road traffic, e.g. in accordance with the Geneva Convention on Road Traffic of 1949 or the Vienna Convention on Road Traffic of 1968.

- f) the name or symbol of the manufacturer and other identification of the IBC, as specified by the appropriate national authority;
- g) the stacking test load in kg. For IBCs not designed for stacking, the figure “0” must be shown;
- h) the maximum permissible gross mass in kg.

...

Part 7

OPERATOR’S RESPONSIBILITIES

...

DGP-WG/17-WP/46 (see paragraph 3.5.1.1 of this report):

Chapter 1

ACCEPTANCE PROCEDURES

...

1.7 CONDUCTING SAFETY RISK ASSESSMENTS

1.7.1 Operators engaged in commercial air transport operations should include a safety risk assessment process for the transport of dangerous goods as part of their approved safety management system to comply with Annexes 6 — *Operation of Aircraft* and 19. This safety risk assessment should include appropriate information to result in implementation of safety measures that ensure the safe transport of dangerous goods including lithium batteries and cells as cargo.

1.7.2 Operators should undertake a safety risk assessment when there is a change in the operational environment.

...

3	Note 2	—	==	—	==	—	—	x	—	—	x
4.1	Note 2	==	==	==	==	==	==	==	==	==	x
4.2	Note 2	—	==	—	==	—	—	x	—	—	==
4.3	Note 2	—	==	—	==	—	—	—	—	x	==
5.1	Note 2	—	==	x	==	x	—	—	—	—	x
5.2	Note 2	—	==	—	==	—	—	—	—	—	==
8	Note 2	—	==	—	==	—	x	—	—	—	==
⁹ see 2.2.1.2	Note 2	x		x	x			x			

An “x” at the intersection of a row and column indicates that packages containing these classes of dangerous goods may not be stowed next to or in contact with each other, or in a position which would allow interaction in the event of leakage of the contents. Thus, a package containing Class 3 dangerous goods may not be stowed next to or in contact with a package containing Division 5.1 dangerous goods.

Note 1.— See 2.2.2.2 through 2.2.2.5.

Note 2.— This class or division must not be stowed together with explosives other than those in Division 1.4, Compatibility Group S.

Note 3.— Packages containing dangerous goods with multiple hazards in the class or divisions which require segregation in accordance with Table 7-1 need not be segregated from other packages bearing the same UN number.

Note 4.— UN 3528, Engines, internal combustion, flammable liquid powered, Engines, fuel cell, flammable liquid powered, Machinery internal combustion, flammable liquid powered and Machinery, fuel cell, flammable liquid powered need not be segregated from packages containing dangerous goods in Division 5.1.

...

2.4 LOADING AND SECURING OF DANGEROUS GOODS

2.4.1 Loading of cargo aircraft

...

DGP-WG/16-WP/54 (see paragraph 3.2.7.4):

2.4.1.2 The requirements of 2.4.1.1 a), b or c) do not apply to:

Alignment with the UN agreement that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

- a) flammable liquids (Class 3), Packing Group III, other than those with a subsidiary-~~risk~~ hazard of Class 8;
- b) toxic substances (Division 6.1) with no subsidiary-~~risk~~ hazard other than Class 3;
- c) infectious substances (Division 6.2);
- d) radioactive material (Class 7);
- e) miscellaneous dangerous goods (Class 9).

DGP-WG/17-WP/4 (see paragraph 3.2.7.2 of this report):

Note — When transporting goods in a non-pressurized cargo-~~hold~~ compartment, there will be a large pressure differential up to 75 kPa at cruise altitudes. Packages that are filled at a normal atmospheric pressure may not be capable of withstanding this pressure differential. Confirmation of the suitability of the packagings from the shipper should be obtained.

...

2.9 SPECIAL PROVISIONS APPLICABLE TO THE CARRIAGE OF RADIOACTIVE MATERIAL**2.9.1 LIMITATION OF EXPOSURE OF PERSONS TO RADIATION**

...

2.9.3 STOWAGE DURING TRANSPORT AND STORAGE IN TRANSIT

...

2.9.3.3 Loading of freight containers and accumulation of packages, overpacks and freight containers must be controlled as follows:

...

DGP-WG/16-WP/54 (see paragraph 3.2.7.6):

- b) Where a consignment is transported under exclusive use, there is no limit on the sum of the transport indexes aboard a single aircraft, but the requirement on minimum ~~segregation~~-separation distances established in 2.9.6 applies;

...

DGP-WG/17-WP/4 (see paragraph 3.2.7.2 of this report):

2.12 LOADING OF UN 2211, POLYMERIC BEADS, EXPANDABLE OR UN 3314, PLASTICS MOULDING COMPOUND

A total of not more than 100 kg net mass of expandable polymeric beads (or granules), or plastic moulding materials, referenced to Packing Instruction 957, may be carried in any inaccessible ~~hold~~-cargo compartment on any aircraft.

...

UN Model Regulations, 7.1.5 and 7.1.6 (see ST/SG/AC.10/44/Add.1)

The UN Model Regulations have extensive provisions on temperature control with respect to transport operations in 7.1.5. The Technical Instructions contain only the following provisions (amendments proposed are in alignment with changes to the Model Regulations). DGP is invited to consider whether some of the provisions in the UN Model Regulations should be included in the Supplement as guidance when issuing exemptions.

2.13 HANDLING OF SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES AND SUBSTANCES STABILIZED BY TEMPERATURE CONTROL (OTHER THAN SELF-REACTIVE SUBSTANCES AND ORGANIC PEROXIDES)

During the course of transport, packages or unit load devices containing self-reactive substances of Division 4.1-~~or~~, organic peroxides of Division 5.2 and polymerizing substances must be shaded from direct sunlight, stored away from all sources of heat in a well-ventilated area.

...

Chapter 4

PROVISION OF INFORMATION

...

4.1 INFORMATION TO THE PILOT-IN-COMMAND

...

DGP-WG/16-WP/54 (see paragraph 3.2.7.2):

4.1.1.1 Except as otherwise provided, the information required by 4.1.1 must include the following:

~~a)~~ the date of the flight;

~~a)~~ the air waybill number (when issued);

Alignment with the UN agreement that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

~~b)~~ the proper shipping name (the technical name(s) shown on the dangerous goods transport document is not required) and UN Number or ID number as listed in these Instructions. When chemical oxygen generators contained in protective breathing equipment (PBE) are being transported under Special Provision A144, the proper shipping name of “oxygen generator, chemical” must be supplemented with the statement “Aircrew protective breathing equipment (smoke hood) in accordance with Special Provision A144”.

~~e)~~ the class or division, and subsidiary-~~risk~~ hazard(s) corresponding to the subsidiary-~~risk~~ hazard label(s) applied, by numerals, and in the case of Class 1, the compatibility group;

~~e)~~ the packing group shown on the dangerous goods transport document;

~~f)~~ the number of packages and their exact loading location. For radioactive material see g) below;

~~f)~~ the net quantity, or gross mass if applicable, of each package, except that this does not apply to radioactive material or other dangerous goods where the net quantity or gross mass is not required on the dangerous goods transport document (see 5.4.1.4) or, when applicable, alternative written documentation. For a consignment consisting of multiple packages containing dangerous goods bearing the same proper shipping name and UN number or ID number, only the total quantity and an indication of the quantity of the largest and smallest package at each loading location need to be provided. For consumer commodities, the information provided may be either the gross mass of each package or the average gross mass of the packages as shown on the dangerous goods transport document;

~~g)~~ for radioactive material the number of packages, overpacks or freight containers, their category, their transport index (if applicable) and their exact loading location;

~~h)~~ whether the package must be carried on cargo aircraft only;

~~i)~~ the aerodrome at which the package(s) is to be unloaded;

~~j)~~ where applicable, an indication that the dangerous goods are being carried under a State exemption; and

~~k)~~ the telephone number where a copy of the information provided to the pilot-in-command can be obtained during the flight if the operator allows the pilot-in-command to provide a telephone number instead of the details about the dangerous goods on board the aircraft, as specified in 4.3.

DGP-WG/17-WP/4 (see paragraph 3.2.7.2 of this report):

4.1.2 For UN 1845 — **Carbon dioxide, solid** (dry ice), the information required by 4.1.1 may be replaced by the UN number, proper shipping name, class, total quantity in each-~~hold~~ cargo compartment on the aircraft and the aerodrome at which the package(s) is to be unloaded.

...

DGP-WG/17-WP/30 (see paragraph 3.2.7.5 of this report):

Table 7-9. Dangerous goods not required to appear in the information to the pilot-in-command

<i>UN Number</i>	<i>Item</i>	<i>Reference</i>
n/a	Dangerous goods packed in excepted quantities	3;5.1.1
UN 2807	Magnetized material with field strengths causing a compass deflection of not more than 2 degrees at a distance of 4.6 m	Packing Instruction 953
UN 2908	Radioactive material, excepted package — empty packaging	1;6.1.5.1 a)
UN 2909	Radioactive material, excepted package — articles manufactured from natural uranium or depleted uranium or natural thorium	1;6.1.5.1 a)
UN 2910	Radioactive material, excepted package — limited quantity of material	1;6.1.5.1 a)
UN 2911	Radioactive material, excepted package — instruments or articles	1;6.1.5.1 a)
UN 3090	Lithium metal batteries (including lithium alloy batteries) when meeting the requirements of Packing Instruction 968, Section II	Packing Instruction 968, Section II
UN 3091	Lithium metal batteries contained in equipment (including lithium alloy batteries) when meeting the requirements of Packing Instruction 970, Section II	Packing Instruction 970, Section II
UN 3091	Lithium metal batteries packed with equipment (including lithium alloy batteries) when meeting the requirements of Packing Instruction 969, Section II	Packing Instruction 969, Section II
UN 3245	Genetically modified micro-organisms	Packing Instruction 959
UN 3245	Genetically modified organisms	Packing Instruction 959
UN 3373	Biological substance, Category B	Packing Instruction 650, sub-paragraph 11
UN 3480	Lithium ion batteries (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 965, Section II	Packing Instruction 965, Section II
UN 3481	Lithium ion batteries contained in equipment (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 967, Section II	Packing Instruction 967, Section II
UN 3481	Lithium ion batteries packed with equipment (including lithium ion polymer batteries) when meeting the requirements of Packing Instruction 966, Section II	Packing Instruction 966, Section II

...

Alignment with the UN agreement that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98).

4.3 INFORMATION TO BE PROVIDED BY THE PILOT-IN-COMMAND IN CASE OF IN-FLIGHT EMERGENCY

If an in-flight emergency occurs, the pilot-in-command must, as soon as the situation permits, inform the appropriate air traffic services unit, for the information of aerodrome authorities, of any dangerous goods carried as cargo on board an aircraft. Wherever possible this information should include the proper shipping name and/or UN number, the class/division and, for Class 1, the compatibility group, any identified subsidiary-risk hazard(s), the quantity and the location on board the aircraft, or a telephone number where a copy of the information provided to the pilot-in-command can be obtained. When it is not considered possible to include all the information, those parts thought most relevant in the circumstances or a summary of the quantities and class or division of dangerous goods in each cargo compartment should be given.

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Part 8

**PROVISIONS CONCERNING
PASSENGERS AND CREW**

Chapter 1

**PROVISIONS FOR DANGEROUS GOODS
CARRIED BY PASSENGERS OR CREW**

Parts of this Chapter are affected by State Variations US 15, VE 9, VE 10; see Table A-1

1.1 DANGEROUS GOODS CARRIED BY PASSENGERS OR CREW

...

Table 8-1. Provisions for dangerous goods carried by passengers or crew

<i>Items or articles</i>	<i>Location</i>			Approval of the operator(s) is required	The pilot-in-command must be informed	<i>Restrictions</i>
	Checked baggage	Carry-on baggage	On the person			

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Consumer articles

Alignment with the UN agreement that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98):

13) Aerosols in Division 2.2, with no subsidiary risk hazard , for sporting or home use	Yes	No	No	No	No	a) no more than 0.5 kg or 0.5 L total net quantity per single article; b) release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents; and c) no more than 2 kg or 2 L total net quantity of all articles mentioned in 3), 10) and 13) (e.g. four aerosol cans of 500 mL each) per person.
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15) Small packet of safety matches	No	No	Yes	No	No	a) no more than one per person; and b) intended for use by an individual.
“Strike anywhere” matches	No	No	No	n/a	n/a	Forbidden.

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
Small cigarette lighter	No	No	Yes	No	No	a) no more than one per person; b) intended for use by an individual; and c) does not contain unabsorbed liquid fuel (other than liquefied gas).
Lighter fuel and lighter refills	No	No	No	n/a	n/a	Forbidden.

DGP-WG/17-WP/37 (see paragraph 3.5.3.6 of this report):

<u>Battery-powered lighters (powered by a lithium ion or lithium metal battery) (e.g. laser plasma lighters, tesla coil lighters, flux lighters, arc lighters and double arc lighters) without a safety cap or means of protection against unintentional activation</u>	<u>No</u>	<u>No</u>	<u>No</u>	<u>n/a</u>	<u>n/a</u>	<u>Forbidden.</u>
<u>Battery-powered lighters (powered by a lithium ion or lithium metal battery) (e.g. laser plasma lighters, tesla coil lighters, flux lighters, arc lighters and double arc lighters) with a safety cap or means of protection against unintentional activation</u>	<u>No</u>	<u>No</u>	<u>Yes</u>	<u>n/a</u>	<u>n/a</u>	<u>a) carried by passengers or crew for personal use;</u> <u>b) recharging of the devices and/or batteries on board the aircraft is not permitted;</u> <u>c) each battery must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3; and</u> <u>d) Each battery must not exceed the following:</u> <u> i) for lithium metal batteries, a lithium content of 2 grams, or</u> <u> ii) for lithium ion batteries, a Watt-hour rating of 100 Wh.</u>
Premixing burner lighter (see the Glossary of Terms in Attachment 2) with a means of protection against unintentional activation	No	No	Yes	No	No	a) no more than one per person; b) intended for use by an individual; and c) does not contain unabsorbed liquid fuel (other than liquefied gas).
Premixing burner lighter (see the Glossary of Terms in Attachment 2) without a means of protection against unintentional activation	No	No	No	n/a	n/a	Forbidden.

Alignment with the UN agreement that the word “risk” was inappropriately used in many paragraphs of the Model Regulations and should be replaced by the word “hazard” (see ST/SG/AC.10/C.3/98):

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
17) Avalanche rescue backpack containing a cylinder of compressed gas of Division 2.2 without subsidiary risk <u>hazard</u>	Yes	Yes	No	Yes	No	a) no more than one per person; b) may contain a pyrotechnic trigger mechanism which must not contain more than 200 mg net of Division 1.4S; c) the backpack must be packed in such a manner that it cannot be accidentally activated; and d) the airbags within the backpack must be fitted with pressure relief valves.
18) Small cartridges fitted into a self-inflating personal safety device such as a life-jacket or vest	Yes	Yes	Yes	Yes	No	a) no more than one personal safety device per person; b) the personal safety device must be packed in such a manner that it cannot be accidentally activated; c) limited to carbon dioxide or another suitable gas in Division 2.2 without subsidiary risk <u>hazard</u> ; d) must be for inflation purposes; e) the device must be fitted with no more than two small cartridges; and f) no more than two spare cartridges.
Small cartridges for other devices	Yes	Yes	Yes	Yes	No	a) no more than four small cartridges of carbon dioxide or other suitable gas in Division 2.2, without subsidiary risk <u>hazard</u> , per person; and b) the water capacity of each cartridge must not exceed 50 mL. <i>Note.— For carbon dioxide, a gas cartridge with a water capacity of 50 mL is equivalent to a 28 g cartridge.</i>

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DGP-WG/16-WP/54 (see paragraph 3.5.3.1):

20) Portable electronic devices (such as watches, calculating machines, cameras, cellular phones, laptop computers, camcorders, <u>electronic baggage tags</u>)						
Portable electronic devices containing lithium metal or lithium ion cells or batteries (articles containing lithium metal or lithium ion cells or batteries the primary purpose of which is to provide power to another device must be	Yes	Yes	Yes	No	No	a) carried by passengers or crew for personal use; b) should be carried as carry-on baggage; DGP-WG/16-WP/54 (see paragraph 3.5.3.1):

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
carried as spare batteries in accordance with the item below)						<p>c) <u>[except as provided for in paragraph g) below.]</u> each battery must not exceed the following:</p> <ul style="list-style-type: none"> — for lithium metal batteries, a lithium content of 2 grams; or — for lithium ion batteries, a Watt-hour rating of 100 Wh; <hr/> <p>DGP-WG/17-WP/46 (see paragraph 3.5.1.1 of this report):</p> <p>d) if devices are carried in checked baggage,:</p> <ul style="list-style-type: none"> — <u>measures must be taken to prevent unintentional activation and to protect from damage; and</u> — <u>the device must be completely switched off (not in sleep or hibernation mode).</u> <hr/> <p>DGP-WG/16-WP/54 (see paragraph 3.5.3.1):</p> <p><u>e) if devices are carried outside the baggage, e.g. electronic baggage tags, the device must provide adequate protection for the battery fitted inside the device;</u></p> <p><u>f) electronic baggage tags, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active. Active devices must meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems. The device must not be capable of emitting disturbing signals (such as buzzing alarms, strobe lights, etc.) during transport. Active devices in or on checked baggage must be designed with a minimum of two independent means to turn off completely, turn off cellular or mobile functions, or a combination of both when airborne.</u></p> <p><u>g) the electronic baggage tag may only contain one lithium battery, which must not exceed the following:</u></p> <ul style="list-style-type: none"> — <u>for lithium metal batteries, a lithium metal content of 0.3 grams; or</u> — <u>for lithium ion batteries, a Watt-hour rating</u>

Items or articles	Location			Approval of the operator(s) is required	The pilot-in-command must be informed	Restrictions
	Checked baggage	Carry-on baggage	On the person			
						<p><u>of 2.7 Wh; and]</u></p> <p>eh) batteries and cells must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3.</p>

DGP-WG/17-WP/38 (see paragraph 3.5.3.7):

≠	Spare batteries <u>(including power banks)</u> for portable electronic devices containing lithium metal or lithium ion cells or batteries	No	Yes	Yes	No	No	<p>a) carried by passengers or crew for personal use;</p> <p>b) must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch);</p> <p>c) each battery must not exceed the following:</p> <ul style="list-style-type: none"> — for lithium metal batteries, a lithium content of 2 grams; or — for lithium ion batteries, a Watt-hour rating of 100 Wh; and <p>d) batteries and cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3.;</p> <p><u>e) spare batteries including power banks must not be recharged while on board the aircraft; and</u></p> <p><u>f) power banks must not be electrically connected or providing power to an external device.</u></p>
	Portable electronic devices containing lithium ion batteries exceeding a Watt-hour rating of 100 Wh but not exceeding 160 Wh	Yes	Yes	Yes	Yes	No	<p><u>DGP-WG/17-WP/46 (see paragraph 3.5.1.1):</u></p> <p>a) carried by passengers or crew for personal use;</p> <p>b) should be carried as carry-on baggage;;</p> <p><u>c) if devices are carried in checked baggage:</u></p> <ul style="list-style-type: none"> — <u>measures must be taken to prevent unintentional activation and to protect from damage;</u> — <u>the device must be completely switched off (not in sleep or hibernation mode); and</u> <p>ed) batteries and cells must be of a type which meets the requirements of each test in the UN <i>Manual of Tests and Criteria</i>, Part III, subsection 38.3.</p>

<i>Items or articles</i>	<i>Location</i>			<i>Approval of the operator(s) is required</i>	<i>The pilot-in-command must be informed</i>	<i>Restrictions</i>
	<i>Checked baggage</i>	<i>Carry-on baggage</i>	<i>On the person</i>			
Spare batteries for portable electronic devices containing lithium ion batteries exceeding a Watt-hour rating of 100 Wh but not exceeding 160 Wh	No	Yes	Yes	Yes	No	a) carried by passengers or crew for personal use; b) no more than two individually protected spare batteries per person; c) must be individually protected so as to prevent short circuits (by placement in original retail packaging or by otherwise insulating terminals, e.g. by taping over exposed terminals or placing each battery in a separate plastic bag or protective pouch); and d) batteries and cells must be of a type which meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3.

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ATTACHMENT A**PROPOSED AMENDMENTS TO TABLE 3-1 — UN NUMBER ORDER**

The format for displaying the amendments to Table 3-1 is as follows:

Modified entries

- both the original and the modified entry are printed;
- both modified and non-modified fields are printed;
- the original entry is printed in a shaded box with an asterisk in the left margin;
- check boxes are printed above the field(s) which have been modified;
- the modified entry is shown without shading below the original entry; and
- the “≠” symbol is printed in the left margin.

Deleted entries

- deleted entries are displayed in a shaded box with an asterisk in the left margin;
- check boxes are shown above each field; and
- the “>” symbol is displayed in the left margin below the shaded box to indicate that the entry will be deleted.

New entries

New entries are shown without shading with the “+” symbol in the left margin.

Table 3-1. Dangerous Goods List

Name	UN No.	Class or division	Sub-sidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Articles, explosive, n.o.s.*	0349	1.4S		Explosive 1.4		<input checked="" type="checkbox"/> A62		E0	101	25 kg	101	100 kg
≠ Articles, explosive, n.o.s.*	0349	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
* Fuzes, detonating †	0367	1.4S		Explosive 1.4		<input checked="" type="checkbox"/>		E0	141	25 kg	141	100 kg
≠ Fuzes, detonating †	0367	1.4S		Explosive 1.4		A165		E0	141	25 kg	141	100 kg
* Components, explosive train, n.o.s.* †	0384	1.4S		Explosive 1.4		<input checked="" type="checkbox"/> A62		E0	101	25 kg	101	100 kg
≠ Components, explosive train, n.o.s.* †	0384	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
* Substances, explosive, n.o.s.*	0481	1.4S		Explosive 1.4		<input checked="" type="checkbox"/> A62		E0	101	25 kg	101	100 kg
≠ Substances, explosive, n.o.s.*	0481	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
* Ammonium nitrate based fertilizer	2067	5.1		Oxidizer		<input checked="" type="checkbox"/> A64 A79 A89	III	E1	559 Y546	25 kg 10 kg	563	100 kg
≠ Ammonium nitrate based fertilizer	2067	5.1		Oxidizer		A64 A79	III	E1	559 Y546	25 kg 10 kg	563	100 kg
* Ammonium nitrate based fertilizer	2071	9		Miscellaneous		<input checked="" type="checkbox"/> A89 A90	III	E1	958 Y958	200 kg 30 kg G	958	200 kg
≠ Ammonium nitrate based fertilizer	2071	9		Miscellaneous		A90	III	E1	958 Y958	200 kg 30 kg G	958	200 kg

Chapter 2

3-2-3

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only		
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package	
1	2	3	4	5	6	7	8	9	10	11	12	13	
* Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous — Lithium batteries	US 2 US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A183 A201 A206			E0	FORBIDDEN	See 968		
≠ Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous — Lithium batteries	US 2 US 3	A88 A99 A154 A164 A183 A201 A206 A213			E0	FORBIDDEN	See 968		
* Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	<input checked="" type="checkbox"/> A48 A88 A99 A154 A164 A181 A185 A206			E0	970	5 kg	970	35 kg
≠ Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	A48 A88 A99 A154 A164 A181 A185 A206 A213			E0	970	5 kg	970	35 kg

3-2-4

Part 3

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A181 A185 A206		E0	969	5 kg	969	35 kg
≠ Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	A88 A99 A154 A164 A181 A185 A206 A213		E0	969	5 kg	969	35 kg
* Vehicle, flammable gas powered	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A203 A207		E0	FORBIDDEN		951	No limit
≠ Vehicle, flammable gas powered	3166	9		Miscellaneous		A70 A87 A118 A120 A214		E0	FORBIDDEN		951	No limit
* Vehicle, flammable liquid powered	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A203 A207		E0	950	No limit	950	No limit
≠ Vehicle, flammable liquid powered	3166	9		Miscellaneous		A70 A87 A118 A120 A214		E0	950	No limit	950	No limit

Chapter 2

3-2-5

Name 1	UN No. 2	Class or division 3	Sub-sidiary hazard 4	Labels 5	State variations 6	Special provisions 7	UN packing group 8	Excepted quantity 9	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction 10	Max. net quantity per package 11	Packing instruction 12	Max. net quantity per package 13
* Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	FORBIDDEN		951	No limit
≠ Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		A70 A87 A118 A120 A176 A214		E0	FORBIDDEN		951	No limit
* Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	950	No limit	950	No limit
≠ Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		A70 A87 A118 A120 A176 A214		E0	950	No limit	950	No limit
* Battery-powered equipment	3171	9		Miscellaneous		<input checked="" type="checkbox"/> A21 A67 A87 A94 A164 A182		E0	952	No limit	952	No limit
≠ Battery-powered equipment	3171	9		Miscellaneous		A67 A87 A94 A164 A182 A214		E0	952	No limit	952	No limit

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only		
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package	
									10	11	12	13	
* Battery-powered vehicle	3171	9		Miscellaneous		<input checked="" type="checkbox"/> A21 A67 A87 A94 A164		E0	952	No limit	952	No limit	
≠ Battery-powered vehicle	3171	9		Miscellaneous		A67 A87 A94 A164 A214		E0	952	No limit	952	No limit	
* <input checked="" type="checkbox"/> 2-Dimethylaminoethyl acrylate	3302	6.1		Toxic		<input checked="" type="checkbox"/>		II	E4	654 Y641	5 L 1 L	662	60 L
≠ 2-Dimethylaminoethyl acrylate, stabilized	3302	6.1		Toxic		A209		II	E4	654 Y641	5 L 1 L	662	60 L
* Chemical kit	3316	9		Miscellaneous		A44 A163	<input checked="" type="checkbox"/>	II III	E0	960 Y960 960 Y960	<input checked="" type="checkbox"/> 10 kg 1 kg 10 kg 1 kg	960 960	10 kg 10 kg
≠ Chemical kit	3316	9		Miscellaneous		A44 A163			E0	960 Y960	10 kg 1 kg	960	10 kg
* First aid kit	3316	9		Miscellaneous		A44 A163	<input checked="" type="checkbox"/>	II III	E0 E0	960 Y960 960 Y960	<input checked="" type="checkbox"/> 10 kg 1 kg 10 kg 1 kg	960 960	10 kg 10 kg
≠ First aid kit	3316	9		Miscellaneous		A44 A163			E0	960 Y960	10 kg 1 kg	960	10 kg
* Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium batteries	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A183 A201 A206			E0	FORBIDDEN		See 965	
≠ Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A183 A201 A206 A213			E0	FORBIDDEN		See 965	

Chapter 2

3-2-7

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	<input checked="" type="checkbox"/> A48 A88 A99 A154 A164 A181 A185 A206		E0	967	5 kg	967	35 kg
≠ Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	A48 A88 A99 A154 A164 A181 A185 A206 A213		E0	967	5 kg	967	35 kg
* Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A181 A185 A206		E0	966	5 kg	966	35 kg
≠ Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A181 A185 A206 A213		E0	966	5 kg	966	35 kg
* Engine, internal combustion, flammable liquid powered	3528	3		Liquid flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	378	No limit	378	No limit
≠ Engine, internal combustion, flammable liquid powered	3528	3		Liquid flammable		A70 A87 A208		E0	378	No limit	378	No limit

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Engine, fuel cell, flammable liquid powered †	3528	3		Liquid flammable		☑ A67 A70 A87 A176 A208		E0	378	No limit	378	No limit
≠ Engine, fuel cell, flammable liquid powered †	3528	3		Liquid flammable		A70 A87 A176 A208		E0	378	No limit	378	No limit
* Machinery, internal combustion, flammable liquid powered	3528	3		Liquid flammable		☑ A67 A70 A87 A208		E0	378	No limit	378	No limit
≠ Machinery, internal combustion, flammable liquid powered	3528	3		Liquid flammable		A70 A87 A208		E0	378	No limit	378	No limit
* Machinery, fuel cell, flammable liquid powered	3528	3		Liquid flammable		☑ A67 A70 A87 A176 A208		E0	378	No limit	378	No limit
≠ Machinery, fuel cell, flammable liquid powered	3528	3		Liquid flammable		A70 A87 A176 A208		E0	378	No limit	378	No limit
* Engine, internal combustion, flammable gas powered	3529	2.1		Gas flammable		☑ A67 A70 A87 A208		E0	FORBIDDEN		220	No limit
≠ Engine, internal combustion, flammable gas powered	3529	2.1		Gas flammable		A70 A87 A208		E0	FORBIDDEN		220	No limit

Chapter 2

3-2-9

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Engine, fuel cell, flammable gas powered †	3529	2.1		Gas flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	FORBIDDEN	220	No limit	
≠ Engine, fuel cell, flammable gas powered †	3529	2.1		Gas flammable		A70 A87 [A176] A208		E0	FORBIDDEN	220	No limit	
* Machinery, internal combustion, flammable gas powered	3529	2.1		Gas flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	FORBIDDEN	220	No limit	
≠ Machinery, internal combustion, flammable gas powered	3529	2.1		Gas flammable		A70 A87 A208		E0	FORBIDDEN	220	No limit	
* Machinery, fuel cell, flammable gas powered	3529	2.1		Gas flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	FORBIDDEN	220	No limit	
≠ Machinery, fuel cell, flammable gas powered	3529	2.1		Gas flammable		A70 A87 [A176] A208		E0	FORBIDDEN	220	No limit	
+ Toxic solid, flammable, inorganic, n.o.s.*	3535	6.1	4.1	Toxic & Solid flammable			I II	E4 E4	665 668 Y664	1 kg 15 kg 1 kg	672 675	15 kg 50 kg
+ Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal batteries	3536	9				[AXX]		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing flammable gas, n.o.s.*	3537	2.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing non-flammable, non toxic gas, n.o.s.*	3538	2.2				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing toxic gas, n.o.s.*	3539	2.3				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing flammable liquid, n.o.s.*	3540	3				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing flammable solid, n.o.s.*	3541	4.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing a substance liable to spontaneous combustion, n.o.s.*	3542	4.2				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing a substance which emits flammable gas in contact with water, n.o.s.*	3543	4.3				A2		E0	FORBIDDEN		FORBIDDEN	

Name	UN No.	Class or division	Sub-sidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
+ Articles containing oxidizing substance, n.o.s.*	3544	5.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing organic peroxide, n.o.s.*	3545	5.2				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing toxic substance, n.o.s.*	3546	6.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing corrosive substance, n.o.s.*	3547	8				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing miscellaneous dangerous goods, n.o.s.*	3548	9				A2		E0	FORBIDDEN		FORBIDDEN	

ATTACHMENT B**PROPOSED AMENDMENTS TO TABLE 3-1 — ALPHABETICAL ORDER**

The format for displaying the amendments to Table 3-1 is as follows:

Modified entries

- both the original and the modified entry are printed;
- both modified and non-modified fields are printed;
- the original entry is printed in a shaded box with an asterisk in the left margin;
- check boxes are printed above the field(s) which have been modified;
- the modified entry is shown without shading below the original entry; and
- the “≠” symbol is printed in the left margin.

Deleted entries

- deleted entries are displayed in a shaded box with an asterisk in the left margin;
- check boxes are shown above each field; and
- the “>” symbol is displayed in the left margin below the shaded box to indicate that the entry will be deleted.

New entries

New entries are shown without shading with the “+” symbol in the left margin.

Table 3-1. Dangerous Goods List

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Ammonium nitrate based fertilizer	2067	5.1		Oxidizer		<input checked="" type="checkbox"/> A64 A79 A89	III	E1	559 Y546	25 kg 10 kg	563	100 kg
≠ Ammonium nitrate based fertilizer	2067	5.1		Oxidizer		A64 A79	III	E1	559 Y546	25 kg 10 kg	563	100 kg
* Ammonium nitrate based fertilizer	2071	9		Miscellaneous		<input checked="" type="checkbox"/> A89 A90	III	E1	958 Y958	200 kg 30 kg G	958	200 kg
≠ Ammonium nitrate based fertilizer	2071	9		Miscellaneous		A90	III	E1	958 Y958	200 kg 30 kg G	958	200 kg
+ Articles containing a substance liable to spontaneous combustion, n.o.s.*	3542	4.2				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing a substance which emits flammable gas in contact with water, n.o.s.*	3543	4.3				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing corrosive substance, n.o.s.*	3547	8				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing flammable gas, n.o.s.*	3537	2.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing flammable liquid, n.o.s.*	3540	3				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing flammable solid, n.o.s.*	3541	4.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing miscellaneous dangerous goods, n.o.s.*	3548	9				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing non-flammable, non toxic gas, n.o.s.*	3538	2.2				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing organic peroxide, n.o.s.*	3545	5.2				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing oxidizing substance, n.o.s.*	3544	5.1				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing toxic gas, n.o.s.*	3539	2.3				A2		E0	FORBIDDEN		FORBIDDEN	
+ Articles containing toxic substance, n.o.s.*	3546	6.1				A2		E0	FORBIDDEN		FORBIDDEN	
* Articles, explosive, n.o.s.*	0349	1.4S		Explosive 1.4		<input checked="" type="checkbox"/> A62		E0	101	25 kg	101	100 kg
≠ Articles, explosive, n.o.s.*	0349	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg

Chapter 2

3-2-3

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Battery-powered equipment	3171	9		Miscellaneous		<input checked="" type="checkbox"/> A21 A67 A87 A94 A164 A182		E0	952	No limit	952	No limit
≠ Battery-powered equipment	3171	9		Miscellaneous		A67 A87 A94 A164 A182 A214		E0	952	No limit	952	No limit
* Battery-powered vehicle	3171	9		Miscellaneous		<input checked="" type="checkbox"/> A21 A67 A87 A94 A164		E0	952	No limit	952	No limit
≠ Battery-powered vehicle	3171	9		Miscellaneous		A67 A87 A94 A164 A214		E0	952	No limit	952	No limit
* Chemical kit	3316	9		Miscellaneous			<input checked="" type="checkbox"/> II III	E0	960 Y960 960 Y960	<input checked="" type="checkbox"/> 10 kg 1 kg 10 kg 1 kg	960 960	10 kg 10 kg
≠ Chemical kit	3316	9		Miscellaneous		A44 A163		E0	960 Y960	10 kg 1 kg	960	10 kg
* Components, explosive train, n.o.s.* †	0384	1.4S		Explosive 1.4		<input checked="" type="checkbox"/> A62		E0	101	25 kg	101	100 kg
≠ Components, explosive train, n.o.s.* †	0384	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
* 2-Dimethylaminoethyl acrylate	3302	6.1		Toxic		<input checked="" type="checkbox"/>	II	E4	654 Y641	5 L 1 L	662	60 L
≠ 2-Dimethylaminoethyl acrylate, stabilized	3302	6.1		Toxic		A209	II	E4	654 Y641	5 L 1 L	662	60 L

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Engine, fuel cell, flammable gas powered †	3529	2.1		Gas flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	FORBIDDEN		220	No limit
≠ Engine, fuel cell, flammable gas powered †	3529	2.1		Gas flammable		A70 A87 [A176] A208		E0	FORBIDDEN		220	No limit
* Engine, fuel cell, flammable liquid powered †	3528	3		Liquid flammable		<input checked="" type="checkbox"/> A67 A70 A87 A176 A208		E0	378	No limit	378	No limit
≠ Engine, fuel cell, flammable liquid powered †	3528	3		Liquid flammable		A70 A87 A176 A208		E0	378	No limit	378	No limit
* Engine, internal combustion, flammable gas powered	3529	2.1		Gas flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	FORBIDDEN		220	No limit
≠ Engine, internal combustion, flammable gas powered	3529	2.1		Gas flammable		A70 A87 A208		E0	FORBIDDEN		220	No limit
* Engine, internal combustion, flammable liquid powered	3528	3		Liquid flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	378	No limit	378	No limit
≠ Engine, internal combustion, flammable liquid powered	3528	3		Liquid flammable		A70 A87 A208		E0	378	No limit	378	No limit
* First aid kit	3316	9		Miscellaneous		A44 A163	<input checked="" type="checkbox"/> II III	E0 E0	960 Y960 960 Y960	<input checked="" type="checkbox"/> 10 kg 1 kg 10 kg 1 kg	960 960	10 kg 10 kg
≠ First aid kit	3316	9		Miscellaneous		A44 A163		E0	960 Y960	10 kg 1 kg	960	10 kg

Chapter 2

3-2-5

Name	UN No.	Class or division	Sub-sidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Fuzes, detonating †	0367	1.4S		Explosive 1.4		☑		E0	141	25 kg	141	100 kg
≠ Fuzes, detonating †	0367	1.4S		Explosive 1.4		A165		E0	141	25 kg	141	100 kg
+ Lithium batteries installed in cargo transport unit lithium ion batteries or lithium metal batteries	3536	9				[AXX]		E0	FORBIDDEN		FORBIDDEN	
* Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium batteries	US 3	☑ A88 A99 A154 A164 A183 A201 A206		E0	FORBIDDEN		See 965	
≠ Lithium ion batteries (including lithium ion polymer batteries)	3480	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A183 A201 A206 A213		E0	FORBIDDEN		See 965	
* Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	☑ A48 A88 A99 A154 A164 A181 A185 A206		E0	967	5 kg	967	35 kg
≠ Lithium ion batteries contained in equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	A48 A88 A99 A154 A164 A181 A185 A206 A213		E0	967	5 kg	967	35 kg

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Part 3

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A181 A185 A206		E0	966	5 kg	966	35 kg
≠ Lithium ion batteries packed with equipment (including lithium ion polymer batteries)	3481	9		Miscellaneous — Lithium batteries	US 3	A88 A99 A154 A164 A181 A185 A206 A213		E0	966	5 kg	966	35 kg
* Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous — Lithium batteries	US 2 US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A183 A201 A206		E0	FORBIDDEN		See 968	
≠ Lithium metal batteries (including lithium alloy batteries) †	3090	9		Miscellaneous — Lithium batteries	US 2 US 3	A88 A99 A154 A164 A183 A201 A206 A213		E0	FORBIDDEN		See 968	

Chapter 2

3-2-7

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	<input checked="" type="checkbox"/> A48 A88 A99 A154 A164 A181 A185 A206		E0	970	5 kg	970	35 kg
≠ Lithium metal batteries contained in equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	A48 A88 A99 A154 A164 A181 A185 A206 A213		E0	970	5 kg	970	35 kg
* Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	<input checked="" type="checkbox"/> A88 A99 A154 A164 A181 A185 A206		E0	969	5 kg	969	35 kg
≠ Lithium metal batteries packed with equipment (including lithium alloy batteries) †	3091	9		Miscellaneous — Lithium batteries	US 2 US 3	A88 A99 A154 A164 A181 A185 A206 A213		E0	969	5 kg	969	35 kg
* Machinery, fuel cell, flammable gas powered	3529	2.1		Gas flammable		<input checked="" type="checkbox"/> A67 A70 A87 A208		E0	FORBIDDEN		220	No limit
≠ Machinery, fuel cell, flammable gas powered	3529	2.1		Gas flammable		A70 A87 [A176] A208		E0	FORBIDDEN		220	No limit

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
									10	11	12	13
* Machinery, fuel cell, flammable liquid powered	3528	3		Liquid flammable		☑ A67 A70 A87 A176 A208		E0	378	No limit	378	No limit
≠ Machinery, fuel cell, flammable liquid powered	3528	3		Liquid flammable		A70 A87 A176 A208		E0	378	No limit	378	No limit
* Machinery, internal combustion, flammable gas powered	3529	2.1		Gas flammable		☑ A67 A70 A87 A208		E0	FORBIDDEN		220	No limit
≠ Machinery, internal combustion, flammable gas powered	3529	2.1		Gas flammable		A70 A87 A208		E0	FORBIDDEN		220	No limit
* Machinery, internal combustion, flammable liquid powered	3528	3		Liquid flammable		☑ A67 A70 A87 A208		E0	378	No limit	378	No limit
≠ Machinery, internal combustion, flammable liquid powered	3528	3		Liquid flammable		A70 A87 A208		E0	378	No limit	378	No limit
* Substances, explosive, n.o.s.*	0481	1.4S		Explosive 1.4		☑ A62		E0	101	25 kg	101	100 kg
≠ Substances, explosive, n.o.s.*	0481	1.4S		Explosive 1.4		A62 A165		E0	101	25 kg	101	100 kg
+ Toxic solid, flammable, inorganic, n.o.s.*	3535	6.1	4.1	Toxic & Solid flammable			I II	E4 E4	665 668 Y664	1 kg 15 kg 1 kg	672 675	15 kg 50 kg

Chapter 2

3-2-9

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Vehicle, flammable gas powered	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A203 A207		E0	FORBIDDEN		951	No limit
≠ Vehicle, flammable gas powered	3166	9		Miscellaneous		A70 A87 A118 A120 A214		E0	FORBIDDEN		951	No limit
* Vehicle, flammable liquid powered	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A203 A207		E0	950	No limit	950	No limit
≠ Vehicle, flammable liquid powered	3166	9		Miscellaneous		A70 A87 A118 A120 A214		E0	950	No limit	950	No limit
* Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	FORBIDDEN		951	No limit
≠ Vehicle, fuel cell, flammable gas powered †	3166	9		Miscellaneous		A70 A87 A118 A120 A176 A214		E0	FORBIDDEN		951	No limit

Name	UN No.	Class or division	Subsidiary hazard	Labels	State variations	Special provisions	UN packing group	Excepted quantity	Passenger and cargo aircraft		Cargo aircraft only	
									Packing instruction	Max. net quantity per package	Packing instruction	Max. net quantity per package
1	2	3	4	5	6	7	8	9	10	11	12	13
* Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		<input checked="" type="checkbox"/> A67 A70 A87 A118 A120 A134 A176 A203 A207		E0	950	No limit	950	No limit
≠ Vehicle, fuel cell, flammable liquid powered †	3166	9		Miscellaneous		A70 A87 A118 A120 A176 A214		E0	950	No limit	950	No limit

APPENDIX C

CONSOLIDATION OF AMENDMENTS TO THE SUPPLEMENT TO THE TECHNICAL
INSTRUCTIONS AGREED AT DGP-WG/16 AND DGP-WG/17

Part S-3

DANGEROUS GOODS LIST,
SPECIAL PROVISIONS AND QUANTITY LIMITATIONS

...

Chapter 6

SPECIAL PROVISIONS

...

Table S-3-4. Special Provisions

Supplementary special provisions

...

UN Model Regulations, Chapter 3.3, Special Provision 271 (see ST/SG/AC.10/44/Add.1)

A317 Lactose or glucose or similar materials, may be used as a phlegmatizer provided that the substance contains not less than 90 per cent, by mass, of phlegmatizer. The appropriate national authority may authorize these mixtures to be classified in Division 4.1 on the basis of a Series 6(c) test on at least three packages as prepared for transport. Mixtures containing at least 98 per cent, by mass, of phlegmatizer are not subject to these Instructions. Packages containing mixtures with not less than 90 per cent, by mass, of phlegmatizer need not bear a "Toxic" subsidiary-risk ~~hazard~~ label.

...

Part S-4

PACKING INSTRUCTIONS

...

UN Model Regulations, Chapter 4.1.4.1, packing instruction P910 (see ST/SG/AC.10/44/Add.1)

Packing Instruction 910

Cargo aircraft only

Introduction

This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 production runs consisting of not more than 100 cells ~~and~~ or batteries and to pre-production prototypes of cells ~~and~~ or batteries when these prototypes are transported for testing.

General requirements

Part 4, Chapter 1 requirements must be met.

ADDITIONAL PACKING REQUIREMENTS

- Packagings must meet the Packing Group I performance requirements.
- Cells and batteries must be protected against short circuit. Protection against short circuits includes, but is not limited to:
 - individual protection of the battery terminals;
 - inner packaging to prevent contact between cells and batteries;
 - batteries with recessed terminals designed to protect against short circuits; or
 - the use of an electrically non-conductive and non-combustible cushioning material to fill empty space between the cells or batteries in the packaging.

Cells and batteries, including when packed with equipment

- 1) Batteries and cells, including equipment, of different sizes, shapes or masses must be packaged in an outer packaging of a tested design type listed below provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;
- 2) Each cell or battery must be individually packed in an inner packaging and placed inside an outer packaging;
- 3) Each inner packaging must be completely surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat;
- 4) Appropriate measures must be taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during transport. Cushioning material that is non-combustible and electrically non-conductive may be used to meet this requirement;
- 5) Non-combustibility must be assessed according to a standard recognized in the State where the packaging is designed or manufactured;
- 6) A cell or battery with a net mass of more than 30 kg must be limited to one cell or battery per outer packaging.

Packing Instruction 910

Cells and batteries contained in equipment

- 1) Equipment of different sizes, shapes or masses must be packed in an outer packaging of a tested design type listed below provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;
- 2) The equipment must be constructed or packaged in such a manner as to prevent accidental operation during transport;
- 3) Appropriate measures must be taken to minimize the effects of vibration and shocks and prevent movement of the equipment within the package that may lead to damage and a dangerous condition during transport. When cushioning material is used to meet this requirement it must be non-combustible and electrically non-conductive; and
- 4) Non-combustibility must be assessed according to a standard recognized in the State where the packaging is designed or manufactured.

Equipment or batteries not subject to Part 6 of these Instructions

Lithium batteries with a mass of 12 kg or greater and having a strong, impact-resistant outer casing, or assemblies of such batteries, may be packed in strong outer packagings or protective enclosures not subject to the requirements of Part 6 of these Instructions under conditions specified by the appropriate national authority. Additional conditions that may be considered in the approval process include, but are not limited to:

- 1) The equipment or the battery must be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and
- 2) The equipment or the battery must be fixed in cradles or crates or other handling devices in such a way that it will not become loose during normal conditions of transport.

OUTER PACKAGINGS

Boxes

Aluminium (4B)
Fibreboard (4G)
Natural wood (4C1, 4C2)
Other metal (4N)
Plywood (4D)
Reconstituted wood (4F)
Plastics (4H1, 4H2)
Steel (4A)

Drums

Aluminium (1B2)
Fibre (1G)
Other metal (1N2)
Plastics (1H2)
Plywood (1D)
Steel (1A2)

Jerricans

Aluminium (3B2)
Plastics (3H2)
Steel (3A2)

APPENDIX D

CONSOLIDATION OF AMENDMENTS TO THE EMERGENCY RESPONSE GUIDANCE
AGREED AT DGP-WG/16 AND DGP-WG/17

Section 4

CHART OF DRILLS AND
LIST OF DANGEROUS GOODS WITH
DRILL REFERENCE NUMBERS

...

4.3 NUMERICAL LIST OF DANGEROUS GOODS WITH DRILL CODES

...

Table 4-1. Aircraft Emergency Response Drills						
...						
DRILL NO.	INHERENT RISK	RISK TO AIRCRAFT	RISK TO OCCUPANTS	SPILL OR LEAK PROCEDURE	FIREFIGHTING PROCEDURE	ADDITIONAL CONSIDERATIONS
	...					
DGP-WG/17-WP/8 (see paragraph 3.4.1 of this report):						
9	No general inherent risk	As indicated by the drill letter	As indicated by the drill letter	Use 100% oxygen; establish and maintain maximum ventilation if "A" drill letter	All agents according to availability—use water if available on "Z" drill letter; no water on "W" drill letter	If "Z" drill letter, consider landing immediately; otherwise, none
10	Gas, flammable, high fire risk if any ignition source present	Fire and/or explosion	Smoke, fumes and heat, and as indicated by the drill letter	Use 100% oxygen; establish and maintain maximum ventilation; no smoking; minimum electrics	All agents according to availability	Possible abrupt loss of pressurization

11	Infectious substances may affect humans or animals if inhaled, ingested or absorbed through the mucous membrane or an open wound	Contamination with Infectious substances	Delayed infection to humans or animals	Do not touch. Minimum re-circulation and ventilation in affected area	All agents according to availability. No water on "Y" drill Letter	Call for a qualified person to meet the aircraft
DGP-WG/16-WP/54 (see paragraph 3.5.3.6) and DGP-WG/17-WP/40 (see paragraph 3.4.2 of this report):						
12	<u>Fire, heat, smoke, toxic and flammable vapour</u>	<u>Fire and/or explosion</u>	<u>Smoke, fumes, heat</u>	<u>Use 100% oxygen; establish and maintain maximum ventilation</u>	<u>All agents according to availability. Use water if available</u>	<u>Possible abrupt loss of pressurization; consider landing immediately</u>
	...					

...

DGP-WG/16-WP/54 (see paragraph 3.5.3.6):

Amend Tables 4-2 and 4-3 as indicated:

<i>UN No.</i>	<i>Drill Code</i>	<i>Proper shipping name</i>
3090	9FZ <u>12FZ</u>	Lithium metal batteries
3091	9FZ <u>12FZ</u>	Lithium metal batteries contained in equipment
3091	9FZ <u>12FZ</u>	Lithium metal batteries packed with equipment
3480	9F <u>12FZ</u>	Lithium ion batteries
3481	9F <u>12FZ</u>	Lithium ion batteries contained in equipment
3481	9F <u>12FZ</u>	Lithium ion batteries packed with Equipment

UN Model Regulations, Dangerous goods list (see ST/SG/AC.10/44/Add.1) and DGP-WG/17-WP/40 (paragraph 3.4.2 of this report)

The following needs to be considered:

- how to handle drill codes for the new n.o.s. entries for articles which do not have subsidiary risks assigned (instead a reference to new provisions for determining subsidiary risk in Part 2, Introductory chapter, paragraph 6 is provided in in column 4 of the dangerous goods list)
- what drill code should be assigned to lithium batteries installed in cargo transport unit

<i>UN No.</i>	<i>Drill Code</i>	<i>Proper shipping name</i>
<u>3535</u>	<u>6F</u>	<u>Toxic solid, flammable, inorganic, n.o.s.*</u>
<u>3536</u>	<u>?</u>	<u>Lithium batteries installed in cargo transport unit</u>
<u>3537</u>	<u>10?</u>	<u>Articles containing flammable gas, n.o.s.*</u>
<u>3538</u>	<u>2?</u>	<u>Articles containing non-flammable, non toxic gas, n.o.s.*</u>
<u>3539</u>	<u>2P?</u>	<u>Articles containing toxic gas, n.o.s.*</u>
<u>3540</u>	<u>3?</u>	<u>Articles containing flammable liquid, n.o.s.*</u>
<u>3541</u>	<u>3?</u>	<u>Articles containing flammable solid, n.o.s.*</u>
<u>3542</u>	<u>4?</u>	<u>Articles containing a substance liable to spontaneous combustion, n.o.s.*</u>
<u>3543</u>	<u>4W?</u>	<u>Articles containing a substance which emits flammable gas in contact with water, n.o.s.*</u>
<u>3544</u>	<u>5?</u>	<u>Articles containing oxidizing substance, n.o.s.*</u>
<u>3545</u>	<u>5?</u>	<u>Articles containing organic peroxide, n.o.s.*</u>
<u>3546</u>	<u>6?</u>	<u>Articles containing toxic substance, n.o.s.*</u>
<u>3547</u>	<u>8?</u>	<u>Articles containing corrosive substance, n.o.s.*</u>
<u>3548</u>	<u>9?</u>	<u>Articles containing miscellaneous dangerous goods, n.o.s.*</u>

— END —