United Nations ECE/TRANS/WP.15/240

Economic and Social Council

Distr.: General
7 March 2018
English
Original: English and French

Economic Commission for Europe

Inland Transport Committee

Working Party on the Transport of Dangerous Goods

European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

Draft amendments to annexes A and B of ADR

At its 103rd session, the Working Party on the Transport of Dangerous Goods requested the secretariat to prepare a consolidated list of all the amendments which it had adopted for entry into force on 1 January 2019 so that they could be made the subject of an official proposal in accordance with the procedure set out in article 14 of ADR, which, following usual practice, the Chairperson would be responsible for transmitting to the depositary through his Government. The notification would have to be issued no later than 1 July 2018, with a reference to 1 January 2019 as the scheduled date of entry into force (see ECE/TRANS/WP.15/239, paragraph 66).

This document contains the requested consolidated list of amendments adopted by the Working Party at its 100th, 101st, 102nd and 103rd sessions (see ECE/TRANS/WP.15/233, annex II, ECE/TRANS/WP.15/235, annex I, ECE/TRANS/WP.15/237, annex I and ECE/TRANS/WP.15/239, annex I).

Chapter 1.1

Delete 1.1.3.1 (b) and add "(b) *(Deleted)*".

1.1.3.5 The amendment does not apply to the English version.

1.1.3.6.3 In the heading to column (3) of the table in 1.1.3.6.3, insert a table note b to read as follows:

"[b] The maximum total quantity for each transport category corresponds to a calculated value of "1000" (see also 1.1.3.6.4)."

1.1.3.6.3, in the table, for Category 4, amend the information in column (2) to read as follows:

"Class 1: 1.4S
Class 2: UN Nos. 3537 to 3539
Class 3: UN No. 3540
Class 4.1: UN Nos. 1331, 1345, 1944, 1945, 2254, 2623 and 3541
Class 4.2: UN Nos. 1361 and 1362 packing group III and UN No. 3542
Class 4.3: UN No. 3543
Class 5.1: UN No. 3544
Class 5.2: UN No. 3545
Class 6.1: UN No. 3546
Class 7: UN Nos. 2908 to 2911
Class 8: UN No. 3547
Class 9: UN Nos. 3268, 3499, 3508, 3509 and 3548
and empty, uncleaned packagings having contained dangerous goods, except for those classified in transport category 0".

1.1.3.6.3 In the text after the table, in the first indent, replace "gross mass in kilograms" by "total mass in kilograms of the articles without their packagings".

1.1.3.6.4 At the end, after the indents, after "shall not exceed", insert "a calculated value of".

1.1.4.2.1 In the first sentence and in (c), after "containers," insert "bulk-containers,".

1.1.4.3 In footnote 1, replace "DSC.1/Circ.12 and Corrigenda" by "CCC.1/Circ.3".

Chapter 1.2

1.2.1 In the definition of "*Animal material*", replace "or animal foodstuffs" by "foodstuffs or feedstuffs derived from animals".

1.2.1 In the definition of "*Control temperature*", replace "or the self-reactive substance" by ", the self-reactive substance or the polymerizing substance".

1.2.1 In the definition of "*GHS*", replace "sixth" by "seventh" and replace "ST/SG/AC.10/30/Rev.6" by "ST/SG/AC.10/30/Rev.7".

1.2.1 In the definition of "*Manual of Tests and Criteria*", after "ST/SG/AC.10/11/Rev.6", insert "and Amend.1".

1.2.1 In the definition of "*UN Model Regulations*", replace "nineteenth" by "twentieth" and replace "(ST/SG/AC.10/1/Rev.19)" by "(ST/SG/AC.10/1/Rev.20)".

1.2.1 Amend the definition of "Hermetically closed tank" to read as follows:

"*"Hermetically closed tank"* means a tank that:

– is not equipped with safety valves, bursting discs, other similar safety devices or vacuum valves; or

– is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10, but is not equipped with vacuum valves.

A tank intended for the carriage of liquid substances with a calculation pressure of at least 4 bar or intended for the carriage of solid substances (powdery or granular) regardless of its calculation pressure is also considered hermetically closed if it:

– is equipped with safety valves preceded by a bursting disc according to 6.8.2.2.10 and vacuum valves, in accordance with the requirements of 6.8.2.2.3; or,

– is not equipped with safety valves, bursting discs or other similar safety devices, but is equipped with vacuum valves, in accordance with the requirements of 6.8.2.2.3.".

1.2.1 Add the following new definitions in alphabetical order:

"*"Diameter"* (for shells of tanks) means the internal diameter of the shell.".

"*"Protective lining"* (for tanks) means a lining or coating protecting the metallic tank material against the substances to be carried;".

NOTE: *This definition does not apply to a lining or coating used only to protect the substance to be carried.".*

"*"Over-moulded cylinder"* means a cylinder intended for the carriage of LPG with a water capacity not exceeding 13 litres made of a coated welded steel inner cylinder with an over-moulded protective case made from cellular plastic, which is non-removable and bonded to the outer surface of the steel cylinder wall;".

Chapter 1.4

1.4.2.2.2 Add the following new sentence at the end: "In the case of 1.4.2.2.1 (c) he may rely on what is certified in the "container/vehicle packing certificate" provided in accordance with 5.4.2.".

Chapter 1.6

1.6.1.1 Replace "30 June 2017" by "30 June 2019". Replace "31 December 2016" by "31 December 2018".

Delete the transitional measures 1.6.1.21, 1.6.1.25, 1.6.1.35, 1.6.1.39, 1.6.1.40 and 1.6.1.42 and add "*(Deleted)*".

1.6.1.40 Replace "subsidiary risk label" by "subsidiary hazard label".

1.6.1.43 Replace "240, 385 and 669" by "388 and 669". Replace "the requirement of 2.2.9.1.7" by "the provisions of 2.2.9.1.7".

1.6.1 Add the following new transitional measures:

"1.6.1.44 Undertakings which participate in the carriage of dangerous goods only as consignors and which did not have to appoint a safety adviser on the basis of the provisions applicable until 31 December 2018 shall, by derogation from the provisions of 1.8.3.1 applicable from 1 January 2019, appoint a safety adviser no later than 31 December 2022.".

"1.6.1.45 Contracting Parties may, until 31 December 2020, continue to issue training certificates for dangerous goods safety advisers conforming to the model applicable until

31 December 2018, instead of those conforming to the requirements of 1.8.3.18 applicable from 1 January 2019. Such certificates may continue in use to the end of their five-year validity.".

"1.6.1.46 The carriage of machinery or equipment not specified in this annex and which happen to contain dangerous goods in their internal or operational equipment and which are therefore assigned to UN Nos 3363, 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 or 3548, which was exempted from the provisions of ADR according to 1.1.3.1 (b) applicable until 31 December 2018, may continue to be exempted from the provisions of ADR until 31 December 2022 provided that measures have been taken to prevent any leakage of contents in normal conditions of carriage.".

1.6.3.17 and 1.6.3.42 Delete and add "*(Deleted)*".

1.6.3.44 Delete ", may continue to be used until their first intermediate or periodic inspection after 31 December 2015. After this date, they".

1.6.3 Add the following new transitional measures:

"1.6.3.47 Fixed tanks (tank-vehicles) and demountable tanks constructed before 1 July 2019, fitted with safety valves meeting the requirements in force up to 31 December 2018 but which do not meet the requirements of 6.8.3.2.9 last sub-paragraph concerning their design or protection applicable from 1 January 2019 may continue to be used until the next intermediate or periodic inspection after 1 January 2021.".

"1.6.3.48 Notwithstanding the requirements of special provision TU42 of 4.3.5 applicable from 1 January 2019, fixed tanks (tank vehicles) and demountable tanks with a shell constructed of aluminium alloy, including those with protective lining, which were used before 1 January 2019 for the carriage of substances with a pH value less than 5.0 or more than 8.0, may continue to be used for the carriage of such substances until 31 December 2026.".

"1.6.3.49 Fixed tanks (tank-vehicles) and demountable tanks constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which do not conform to the requirements of 6.8.2.2.10 concerning the nominal pressure of the bursting disc applicable as from 1 January 2019 may continue to be used.".

"1.6.3.50 Fixed tanks (tank-vehicles) and demountable tanks constructed before 1 July 2019 in accordance with the requirements of 6.8.2.2.3 in force up to 31 December 2018 but which however do not conform to the requirements of 6.8.2.2.3 last paragraph concerning the flame arresters on breather devices applicable from 1 January 2019 may continue to be used.".

"1.6.3.51 Fixed tanks (tank-vehicles) and demountable tanks constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which do not however conform to the requirements of 6.8.2.1.23 concerning the check of the welds in the knuckle area of the tank ends applicable as from 1 January 2019 may continue to be used.".

"1.6.3.52 Fixed tanks (tank-vehicles) and demountable tanks constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which however do not conform to the requirements of 6.8.2.2.11 applicable from 1 January 2019 may continue to be used.".

"1.6.3.53 Type approval certificates issued for fixed tanks (tank-vehicles), demountable tanks and battery-vehicles before 1 July 2019 in accordance with the requirements of 6.8.2.3.1 in force up to 31 December 2018 but which do not, however, conform to the requirements of 6.8.2.3.1 to show the distinguishing sign used on vehicles in international

road traffic[1] of the state whose territory the approval was granted and a registration number applicable as from 1 January 2019 may continue to be used.".

Footnote 1 reads as follows:

"[1] 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.".

1.6.4.15, 1.6.4.38, 1.6.4.44, 1.6.4.45 Delete and add "*(Deleted)*".

1.6.4 Add the following new transitional measures:

"1.6.4.49 Tank-containers constructed before 1 July 2019, fitted with safety valves meeting the requirements in force up to 31 December 2018 but which do not meet the requirements of 6.8.3.2.9 last sub-paragraph concerning their design or protection applicable from 1 January 2019 may continue to be used until the next intermediate or periodic inspection after 1 January 2021.".

"1.6.4.50 Notwithstanding the requirements of special provision TU42 of 4.3.5 applicable from 1 January 2019, tank-containers with a shell constructed of aluminium alloy, including those with a protective lining, which were used before 1 January 2019 for the carriage of substances with a pH value less than 5.0 or more than 8.0, may continue to be used for the carriage of such substances until 31 December 2026.".

"1.6.4.51 Tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which do not conform to the requirements of 6.8.2.2.10 concerning the nominal pressure of the bursting disc applicable as from 1 January 2019 may continue to be used.".

"1.6.4.52 Tank-containers constructed before 1 July 2019 in accordance with the requirements of 6.8.2.2.3 in force up to 31 December 2018 but which however do not conform to the requirements of 6.8.2.2.3 last paragraph concerning the flame arresters on breather devices applicable from 1 January 2019 may continue to be used.".

"1.6.4.53 Tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which do not however conform to the requirements of 6.8.2.1.23 concerning the check of the welds in the knuckle area of the tank ends applicable as from 1 January 2019 may continue to be used.".

"1.6.4.54 Tank-containers constructed before 1 July 2019 in accordance with the requirements in force up to 31 December 2018 but which however do not conform to the requirements of 6.8.2.2.11 applicable from 1 January 2019 may continue to be used.".

1.6.5 Renumber existing footnotes 1 to 3 as footnotes 2 to 4.

1.6.5.4 In the first sentence, after "FL", delete ", OX". Replace "31 December 2016" by "31 December 2018". Replace "31 March 2018" by "31 March 2020".

1.6.5 Add the following new transitional measures:

"1.6.5.21 Certificates of approval for EX/III vehicles intended for the carriage of explosive substances in tanks in compliance with the requirements of 9.1.3.3 applicable up to 31 December 2018 issued before 1 July 2019 not containing the remark concerning the compliance with 9.7.9 may continue to be used until the next annual technical inspection of the vehicle.".

"1.6.5.22 Vehicles first registered (or which entered into service if registration is not mandatory) before 1 January 2021 in compliance with the requirements of 9.7.3 applicable until 31 December 2018, but not in compliance with the requirements of 9.7.3 applicable as from 1 January 2019, may continue to be used.".

Chapter 1.7

1.7.1.1 The amendment does not apply to the English version.

1.7.1.2 The amendment does not apply to the English version.

1.7.5 In the first sentence, replace “subsidiary risk” by “subsidiary hazard”.

Chapter 1.8

1.8.3.1 Before “carriage”, insert “consigning,”.

1.8.3.2 In paragraph (a), replace “smaller than those” by “not exceeding those”.

1.8.3.3 In the ninth indent of the third subparagraph, before “carriage”, insert “consigning,”.

1.8.3.18 In the eighth entry of the certificate (“Valid until …”), before “packing”, insert “consigning,”.

1.8.3 Insert the following new sub-section 1.8.3.19:

“1.8.3.19 *Extension of the certificate*

Where an adviser extends the scope of his certificate during its period of validity by meeting the requirements of 1.8.3.16.2, the period of validity of a new certificate shall remain that of the previous certificate.”.

Chapter 1.9

1.9.5.2.2 For tunnel category B, in the first row of the table, insert a new entry after “Class 1: Compatibility groups A and L;” to read as follows: “Class 2: UN No. 3529;”

1.9.5.2.2 For tunnel category D, in the first row of the table, insert a new entry after “Class 2: Classification codes F, FC, T, TF, TC, TO, TFC and TOC;” to read as follows: “Class 3: UN No. 3528;”

Chapter 1.10

1.10.3 After the heading, insert the following note:

“***NOTE:*** *In addition to the security provisions of ADR, competent authorities may implement further security provisions for reasons other than safety during carriage (see also Article 4, paragraph 1 of the Agreement). In order not to impede international and multimodal carriage by different explosives security marks, it is recommended that such marks be formatted consistent with an internationally harmonized standard (e.g. European Union Commission Directive 2008/43/EC).*”.

1.10.3.1.2 In table 1.10.3.1.2, in the column for “Substance or article”, amend the text of the first line for Class 2 to read as follows: “Flammable, non-toxic gases (classification codes including only letters F or FC)”.

1.10.3.1.5 Replace “subsidiary risk” by “subsidiary hazard”.

Chapter 2.1

2.1.2.1 In the last sentence, replace “subsidiary risk(s)” by “subsidiary hazard(s)” and replace “those risks” by “those hazards”.

2.1.2.5 In the second and in the third sentence, replace “subsidiary risk” by “subsidiary hazard”.

2.1.2.8 The amendment to the first indent does not apply to the English version.

2.1.2.8 In the second indent, replace “subsidiary risk(s)” by “subsidiary hazard(s)”.

2.1.3.3 In the last paragraph, replace “subsidiary risks” by “subsidiary hazards”.

2.1.3.5.5 In footnote 2, after “(Official Journal of the European Communities No. L 226 of 6 September 2000, page 3)” and after “(Official Journal of the European Union No. L312 of 22 November 2008, pages 3-30)”, insert “, as amended”.

2.1.3.7 In the first sentence, replace “subsidiary risk” by “subsidiary hazard”.

2.1.3.7 At the end, add: “For solid ammonium nitrate based fertilizers, see also 2.2.51.2.2, thirteenth and fourteenth indent and Manual of Tests and Criteria, Part III, Section 39.”.

2.1.4 Add the following new sub-section 2.1.4.3:

“**2.1.4.3** ***Samples of energetic materials for testing purposes***

2.1.4.3.1 Samples of organic substances carrying functional groups listed in tables A6.1 and/or A6.3 in Appendix 6 (Screening Procedures) of the Manual of Tests and Criteria may be carried under UN No. 3224 (self-reactive solid type C) or UN No. 3223 (self-reactive liquid type C), as applicable, of Class 4.1 provided that:

(a) The samples do not contain any:

- Known explosives;
- Substances showing explosive effects in testing;
- Compounds designed with the view of producing a practical explosive or pyrotechnic effect; or
- Components consisting of synthetic precursors of intentional explosives;

(b) For mixtures, complexes or salts of inorganic oxidizing substances of Class 5.1 with organic material(s), the concentration of the inorganic oxidizing substance is:

- Less than 15%, by mass, if assigned to packing group I (high hazard) or II (medium hazard); or
- 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 P520 and special packing provisions PP94 or PP95 of 4.1.4.1, as applicable.”.

2.1.5 Add the following new section 2.1.5 and renumber existing 2.1.5 as 2.1.6:

“**2.1.5 Classification of articles as articles containing dangerous goods, n.o.s.**

NOTE: *For articles which do not have a proper shipping name, other than UN Nos. 3537 to 3548, and which contain only dangerous goods within the permitted limited*

quantity amounts specified in Column (7a) of Table A of Chapter 3.2, see UN No. 3363 and special provisions 301 and 672 of Chapter 3.3.

2.1.5.1 Articles containing dangerous goods may be classified as otherwise provided by ADR 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 carriage.

An inner packaging shall not be an article.

2.1.5.2 Such articles may in addition contain batteries. Lithium batteries that are integral to the article shall be of a type proven to meet the testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3, except when otherwise specified by ADR (e.g. for pre-production prototype articles containing lithium batteries or for a small production run, consisting of not more than 100 such articles).

2.1.5.3 This section does not apply to articles for which a more specific proper shipping name already exists in Table A of Chapter 3.2.

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

2.1.5.5 Articles containing dangerous goods shall be assigned to the appropriate Class determined by the hazards present using, where applicable, the table of precedence of hazard in 2.1.3.10 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 shall be considered to present a higher hazard.

2.1.5.6 Subsidiary hazards shall be representative of the primary hazards posed by the other dangerous goods contained within the article. When only one item of dangerous goods is present in the article, the subsidiary hazard(s), if any, shall be the subsidiary hazard(s) identified by the subsidiary hazard label(s) in column (5) of Table A of Chapter 3.2. If the article contains more than one item of dangerous goods and these could react dangerously with one another during carriage, each of the dangerous goods shall be enclosed separately (see 4.1.1.6).".

Chapter 2.2

2.2.1.1.1 (c) Replace "practical effect by explosion or a pyrotechnic effect" by "practical explosive or pyrotechnic effect".

2.2.1.1.5 For "Division 1.4", in the first sentence, replace "risk" by "hazard". For "Division 1.6", in the Note, replace "risk" by "hazard".

2.2.1.1.6 For "Compatibility group L", replace "risk" by "hazard".

2.2.1.1.7.1 (a) Replace "giving a positive result when tested in one of the HSL Flash composition tests in Appendix 7 of the Manual of Tests and Criteria*"* by "containing flash composition (see Note 2 of 2.2.1.1.7.5)".

2.2.1.1.7.5 Amend Note 2 to read as follows:

*"**NOTE 2**: "Flash composition" in this table refers to pyrotechnic substances in powder form or as pyrotechnic units as presented in the fireworks that are used in waterfalls, or to produce an aural effect or used as a bursting charge, or propellant charge unless:*

(a) The time taken for the pressure rise in the HSL Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria is demonstrated to be more than 6 ms for 0.5 g of pyrotechnic substance; or

(b) The pyrotechnic substance gives a negative "-" result in the US Flash Composition Test in Appendix 7 of the Manual of Tests and Criteria.".

2.2.1.1.7.5 The first amendment to the table does not apply to the English version.

2.2.1.1.7.5 In the table, amend the entry for "waterfall" as follows: For classification 1.1G, amend the entry under "Specification" to read: "containing flash composition regardless of the results of Test Series 6 (see 2.2.1.1.7.1 (a))". For classification 1.3G, amend the entry under "Specification" to read: "not containing flash composition".

2.2.1.1.8.2 In Note 2, at the end, replace "risk" by "hazard".

2.2.1.4 The amendments do not apply to the English version.

2.2.2.1.5 For "Toxic gases", in the Note, replace "risk" by "hazard". For "Corrosive gases", in the first and second sentences, replace "risk" by "hazard".

2.2.2.3 In the table for "Other articles containing gas under pressure", for "6A", add "3538 ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.".

2.2.2.3 In the table for "Other articles containing gas under pressure", for "6F", add "3537 ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.".

2.2.2.3 In the table for "Other articles containing gas under pressure", add a new row as follows:

6T	3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.

2.2.3.1.2 For "Subdivision F", replace "risk" by "hazard".

2.2.3.1.3 In the last paragraph, replace "risk(s)" by "hazard(s)" (twice).

2.2.3.1.6 Replace "risk" by "hazard".

2.2.3.3 For "F", replace "risk" by "hazard". For "FT2", in the Note after the entries, replace "risks" by "hazards".

2.2.3.3 In the List of collective entries, for "Flammable liquids and articles containing such substances", for "F3", add "3540 ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.".

2.2.41.1.2 For "F", replace "risk" by "hazard". For "D", replace "risk" by "hazard".

2.2.41.1.7 Replace "risk" by "hazard".

2.2.41.1.12 At the end of the first paragraph, replace "risks" by "hazards".

2.2.41.1.17 Amend to read as follows:

"2.2.41.1.17 Self-reactive substances with an SADT not greater than 55 °C shall be subject to temperature control during carriage. See 7.1.7.".

2.2.41.1.21 At the end, add the following new text: "See 7.1.7.".

2.2.41.1.21 Add the following Note at the end:

*"**NOTE:** Substances meeting the criteria of polymerizing substances and also for inclusion in Classes 1 to 8 are subject to the requirements of special provision 386 of Chapter 3.3."*.

2.2.41.3 In the List of collective entries, for "Flammable solids" and for "Solid desensitized explosives", replace "without subsidiary risk" by "without subsidiary hazard".

2.2.41.3 In the List of collective entries, for "Flammable solids", for "F4", add "3541 ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.".

2.2.41.4 At the end of the first paragraph, replace "4.2.5.2" by "4.2.5.2.6" and add a new sentence to read as follows: "The formulations listed in packing instruction IBC520 of 4.1.4.2 and in portable tank instruction T23 of 4.2.5.2.6 may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.".

2.2.41.4 In the table, insert a new entry to read as follows:

SELF-REACTIVE SUBSTANCE	*Concentration (%)*	*Packing method*	*Control temperature (°C)*	*Emergency temperature (°C)*	*UN generic entry*	*Remarks*
Phosphorothioic acid, O-[(cyanophenyl methylene) azanyl] O,O-diethyl ester	82-91 (Z isomer)	OP8			3227	(10)

2.2.41.4 After the table, in remarks (1), (4), (6), replace "2.2.41.1.17" by "7.1.7.3.1 to 7.1.7.3.6".

2.2.41.4 In remark (2) after the table, replace "risk" by "hazard".

2.2.41.4 After the table, add a new remark (10) to read as follows:

"(10) This entry applies to the technical mixture in n-butanol within the specified concentration limits of the (Z) isomer.".

2.2.42.1.2 Amend the title of subdivision "S" to read "Substances liable to spontaneous combustion, without subsidiary hazard".

2.2.42.1.2 For "S Substances liable to spontaneous combustion, without subsidiary hazard", insert the following new entry: "S6 Articles".

2.2.42.1.5 In Note 3, replace "risks" by "hazards".

2.2.42.1.6 Replace "risk" by "hazard".

2.2.42.3 In the list of collective entries, for "S", replace "risk" by "hazard".

2.2.42.3 In the list of collective entries, for "S Substances liable to spontaneous combustion, without subsidiary hazard", insert the following new entry:

Articles	S6	3542 ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.

2.2.43.1.2 In the title of subdivision "W" replace "without subsidiary risk" by "without subsidiary hazard".

2.2.43.1.5 In the Note, replace "risks" by "hazards".

2.2.43.1.6 Replace "risk" by "hazard".

2.2.43.3 In the list of collective entries, for "W", replace "risk" by "hazard".

2.2.43.3 For "Substances which, in contact with water, emit flammable gases, without subsidiary hazard", for "articles W3", add the following new entry:

"3543 ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S.".

2.2.51.1.2 In the title of subdivision “O” replace “without subsidiary risk” by “without subsidiary hazard”.

2.2.51.1.3 and 2.2.51.1.5 Replace “2.2.51.1.9” by “2.2.51.1.10”.

2.2.51.1.3 At the end of the second sentence, add “or, for solid ammonium nitrate based fertilizers, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth indent”.

2.2.51.1.4 Replace “risk” by “hazard”.

2.2.51.1.5 In the first sentence, after “Section 34.4”, insert “or, for solid ammonium nitrate based fertilizers, Section 39,”.

Insert a new 2.2.51.1.7 to read as follows and renumber subsequent paragraphs accordingly:

“2.2.51.1.7 By exception, solid ammonium nitrate based fertilizers shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39.”.

2.2.51.2.2 Replace the thirteenth indent by the following indents:

“- ammonium nitrate based fertilizers with compositions that lead to exit boxes 4, 6, 8, 15, 31, or 33 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1;

- ammonium nitrate based fertilizers with compositions that lead to exit boxes 20, 23 or 39 of the flowchart of paragraph 39.5.1 of the Manual of Tests and Criteria, Part III, Section 39, unless they have been assigned a suitable UN number in Class 1 or, provided that the suitability for carriage has been demonstrated and that this has been approved by the competent authority, in Class 5.1 other than UN No. 2067;”.

2.2.51.3 In the list of collective entries, for “O”, replace “risk” by “hazard”.

2.2.51.3 For “O Oxidizing substances and articles containing such substances, without subsidiary hazard”, for “articles O3”, add the following new entry:

“3544 ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.”.

2.2.52.1.7 At the end of the first paragraph, replace “risks” by “hazards”.

2.2.52.1.7, third indent Replace “2.2.52.1.15 to 2.2.52.1.18” by “2.2.52.1.15 and 2.2.52.1.16”.

2.2.52.1.7 At the end, replace “2.2.52.1.16” by “7.1.7.3.6”.

2.2.52.1.15 to 2.2.52.1.17 Amend as follows:

Delete 2.2.52.1.15 and 2.2.52.1.16. Renumber 2.2.52.1.17 as 2.2.52.1.15 and add the following new text after the Note: “See 7.1.7.”.

Renumber 2.2.52.1.18 as 2.2.52.1.16.

2.2.52.3 For P1 and P2, add the following new entry:

“3545 ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.”.

2.2.52.4 At the end of the first paragraph, replace “4.2.5.2” by “4.2.5.2.6” and add a new sentence to read as follows: “The formulations listed in packing instruction IBC520 of 4.1.4.2 and in portable tank instruction T23 of 4.2.5.2.6 may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.”.

2.2.52.4 In the table header, last column, replace “risks” by “hazards”.

2.2.52.4 In the table, insert the following new entries:

Organic peroxide	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*	*(11)*
DIISOBUTYRYL PEROXIDE	≤ 42 (as a stable dispersion in water)					OP8	- 20	- 10	3119	
DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE	≤ 42 (as a paste)					OP7	+ 35	+ 40	3116	
1-PHENYLETHYL HYDROPEROXIDE	≤ 38	≥ 62				OP8			3109	

2.2.52.4 In Table Notes 3, 13, 18 and 27, replace “risk” by “hazard”.

2.2.61.1.2 In the title of subdivision “T” replace “without subsidiary risk” by “without subsidiary hazard”.

2.2.61.1.2 For “Toxic substances without subsidiary hazard” add the following new subdivision:

“T10 Articles”.

2.2.61.1.7.2 Replace “(see 2.2.8.1.5)” by “(see 2.2.8.1.4.5)”.

2.2.61.1.11 In the second sentence, replace “risks” by “hazards”.

2.2.61.1.11.2 Replace “risks” by “hazards”.

2.2.61.1.12 Replace “risk” by “hazard”.

2.2.61.3 In the list of collective entries, replace “risk(s)” by “hazard(s)” in all the headings.

2.2.61.3 In the List of collective entries, for “Toxic substances without subsidiary hazard”, add the following new row:

Articles	T10	3546 ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.

2.2.61.3 In the List of collective entries, for “Toxic substances with subsidiary hazard(s)”, for TF3, add:

“3535 TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.”.

2.2.62.1.3 In the definition of “Patient specimens”, after “Patient specimens are” replace “human or animal materials,” by “those”.

2.2.62.1.12.2 Delete the existing paragraph and add “2.2.62.1.12.2 *(Deleted)*”.

Amend Section 2.2.8 to read as follows:

“**2.2.8 CLASS 8 CORROSIVE SUBSTANCES**

2.2.8.1 ***Definition, general provisions and criteria***

2.2.8.1.1 *Corrosive substances* are substances which, by chemical action, will cause irreversible damage to the skin, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport. The heading of this class also covers other substances which form a corrosive liquid only in the presence of water, or which produce corrosive vapour or mist in the presence of natural moisture of the air.

2.2.8.1.2 For substances and mixtures that are corrosive to skin, general classification provisions are provided in 2.2.8.1.4. 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.

2.2.8.1.3 Liquids and solids which may become liquid during carriage, which are judged not to be skin corrosive shall still be considered for their potential to cause corrosion to certain metal surfaces in accordance with the criteria in 2.2.8.1.5.3 (c) (ii).

2.2.8.1.4 *General classification provisions*

[Insert existing 2.2.8.1.2 (Class 8 subdivisions) renumbered as 2.2.8.1.4.1.]

2.2.8.1.4.2 Substances and mixtures of Class 8 are divided among the three packing groups according to their degree of danger in carriage:

(a) *Packing group I:* very dangerous substances and mixtures;

(b) *Packing group II:* substances and mixtures presenting medium danger;

(c) *Packing group III:* substances and mixtures that present minor danger.

2.2.8.1.4.3 Allocation of substances listed in Table A of Chapter 3.2 to the packing groups in Class 8 has been made on the basis of experience taking into account such additional factors as inhalation risk (see 2.2.8.1.4.5) and reactivity with water (including the formation of dangerous decomposition products).

2.2.8.1.4.4 New substances and mixtures can be assigned to packing groups on the basis of the length of time of contact necessary to produce irreversible damage of intact skin tissue in accordance with the criteria in 2.2.8.1.5. Alternatively, for mixtures, the criteria in 2.2.8.1.6 can be used.

2.2.8.1.4.5 A substance or mixture meeting the criteria of Class 8 having an inhalation toxicity of dusts and mists (LC_{50}) 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, shall be allocated to Class 8 (see 2.2.61.1.7.2).

2.2.8.1.5 *Packing group assignment for substances and mixtures*

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

2.2.8.1.5.2 In assigning the packing group in accordance with 2.2.8.1.4.4, account shall be taken of human experience in instances of accidental exposure. In the absence of human experience the assignment shall be based on data obtained from experiments in accordance with OECD Test Guideline 404[1] or 435[2]. A substance or mixture which is determined not to be corrosive in accordance with OECD Test Guideline 430[3] or 431[4] may be considered not to be corrosive to skin for the purposes of ADR without further testing.

2.2.8.1.5.3 Packing groups are assigned to corrosive substances in accordance with the following criteria (see table 2.2.8.1.5.3):

(a) Packing group I is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 60 minutes starting after the exposure time of three minutes or less;

[1] *OECD Guideline for the testing of chemicals No. 404 "Acute Dermal Irritation/Corrosion" 2015*

[2] *OECD Guideline for the testing of chemicals No. 435 "In Vitro Membrane Barrier Test Method for Skin Corrosion" 2015*

[3] *OECD Guideline for the testing of chemicals No. 430 "In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER)" 2015*

[4] *OECD Guideline for the testing of chemicals No. 431 "In Vitro Skin Corrosion: Human Skin Model Test" 2015*

(b) Packing group II is assigned to substances that cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than three minutes but not more than 60 minutes;

(c) Packing group III is assigned to substances that:

(i) Cause irreversible damage of intact skin tissue within an observation period up to 14 days starting after the exposure time of more than 60 minutes but not more than 4 hours; or

(ii) Are judged not to cause 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 shall be used. An acceptable test is prescribed in the 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.*

Table 2.2.8.1.5.3: Table summarizing the criteria in 2.2.8.1.5.3

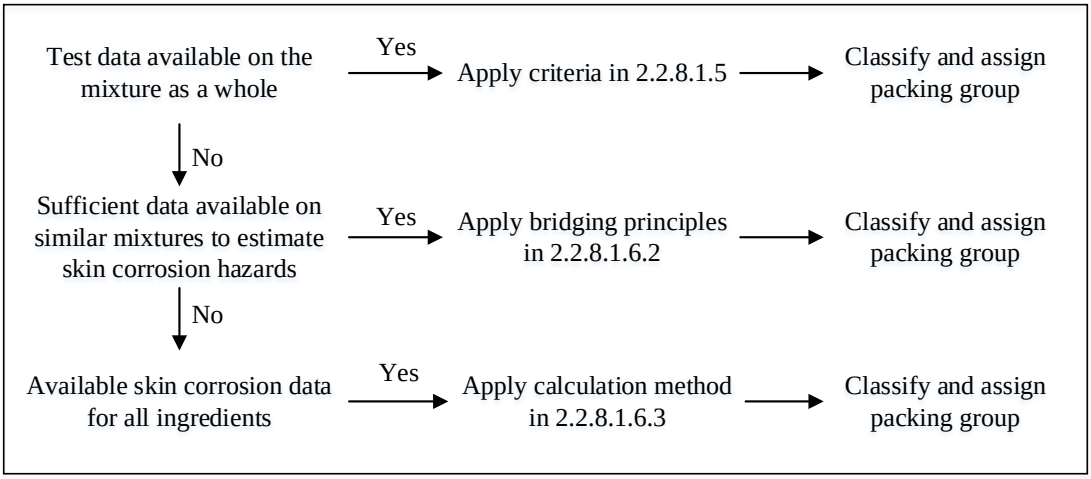
Packing Group	Exposure Time	Observation Period	Effect
I	≤ 3 min	≤ 60 min	Irreversible damage of intact skin
II	> 3 min ≤ 1 h	≤ 14 d	Irreversible damage of intact skin
III	> 1 h ≤ 4 h	≤ 14 d	Irreversible damage of intact skin
III	-	-	Corrosion rate on either steel or aluminium surfaces exceeding 6.25 mm a year at a test temperature of 55 ºC when tested on both materials

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

2.2.8.1.6.1 General provisions

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 2.2.8.1.6.1 below outlines the process to be followed:

Figure 2.2.8.1.6.1: Step-wise approach to classify and assign packing group of corrosive mixtures



2.2.8.1.6.2 Bridging principles

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.

2.2.8.1.6.3 Calculation method based on the classification of the substances

2.2.8.1.6.3.1 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 shall 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.

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

2.2.8.1.6.3.3 To determine whether a mixture containing corrosive substances shall be considered a corrosive mixture and to assign a packing group, the calculation method in the flow chart in Figure 2.2.8.1.6.3 shall be applied.

2.2.8.1.6.3.4 When a specific concentration limit (SCL) is assigned to a substance following its entry in Table A of Chapter 3.2 or in a special provision, this limit shall be used instead of the generic concentration limits (GCL). This appears where 1% is used in the first step for the assessment of the packing group I substances, and where 5% is used for the other steps respectively in Figure 2.2.8.1.6.3.

2.2.8.1.6.3.5 For this purpose, the summation formula for each step of the calculation method shall be adapted. This means that, where applicable, the generic concentration limit shall 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:

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

Where:

PG x_i = 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 2.2.8.1.6.3.

Examples for the application of the above formula can be found in the note below.

NOTE: *Examples for the application of the above formula*

Example 1: A mixture contains one corrosive substance in a concentration of 5% assigned to packing group I without a specific concentration limit:

Calculation for packing group I: $\frac{5}{5\ (GCL)} = 1$ ➔ *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 limit applies. The rest of the mixture needs not to be taken into consideration:

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

Calculation for packing group I: $\frac{3\ (conc\ A)}{30\ (SCL\ PGI)} + \frac{2\ (conc\ B)}{20\ (SCL\ PGI)} = 0{,}2 < 1$

The criterion for packing group I is not fulfilled.

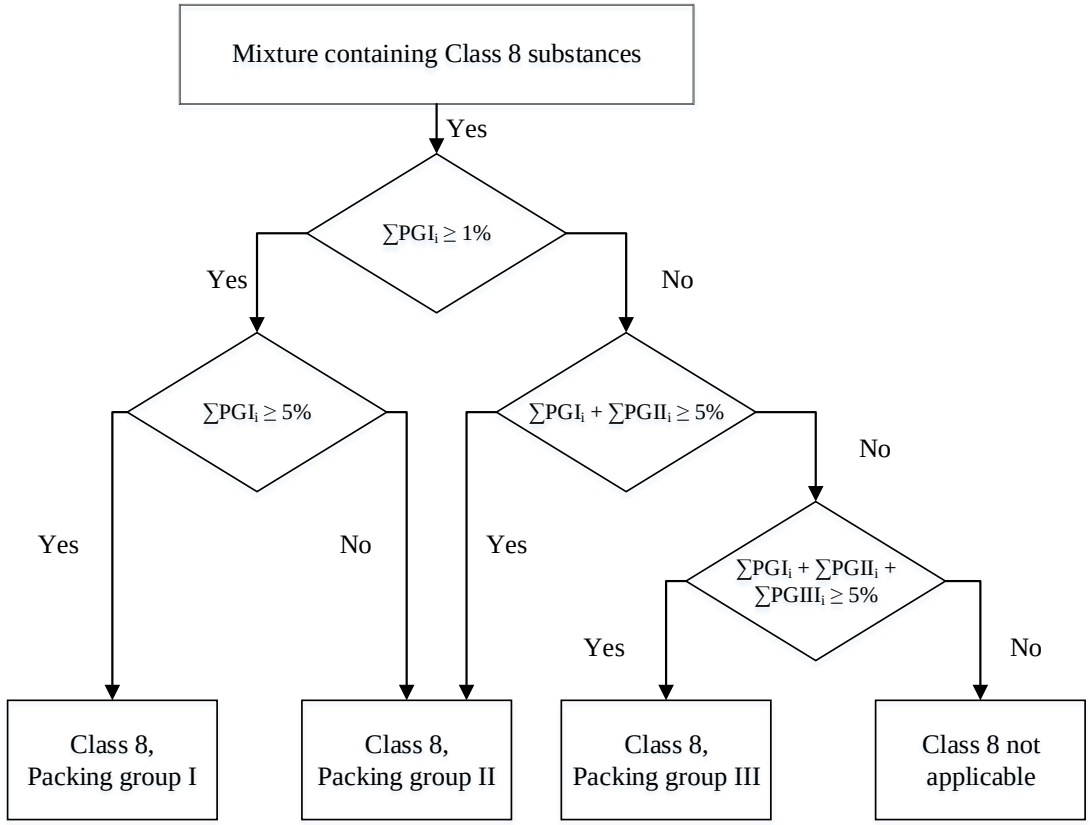
Calculation for packing group II: $\frac{3\ (conc\ A)}{5\ (GCL\ PG\ II)} + \frac{2\ (conc\ B)}{10\ (SCL\ PG\ II)} = 0{,}8 < 1$

The criterion for packing group II is not fulfilled.

Calculation for packing group III: $\frac{3\ (conc\ A)}{5\ (GCL\ PGIII)} + \frac{2\ (conc\ B)}{5\ (GCL\ PG\ III)} + \frac{10\ (conc\ C)}{5\ GCL\ PG\ III)} = 3 \geq 1$

The criterion for packing group III is fulfilled, the mixture shall be assigned to Class 8, packing group III.

Figure 2.2.8.1.6.3: Calculation method



2.2.8.1.7 If substances of Class 8, as a result of admixtures, come into categories of risk different from those to which the substances mentioned by name in Table A of Chapter 3.2 belong, these mixtures or solutions shall be assigned to the entries to which they belong, on the basis of their actual degree of danger.

NOTE: *For the classification of solutions and mixtures (such as preparations and wastes), see also 2.1.3.*

2.2.8.1.8 On the basis of the criteria set out in paragraph 2.2.8.1.6, it may also be determined whether the nature of a solution or mixture mentioned by name or containing a substance mentioned by name is such that the solution or mixture is not subject to the provisions for this class.

NOTE: *UN No. 1910 calcium oxide and UN No. 2812 sodium aluminate, listed in the UN Model Regulations, are not subject to the provisions of ADR.*

2.2.8.2 Substances not accepted for carriage

2.2.8.2.1 *[Existing text unchanged]*

2.2.8.2.1 *[Existing text unchanged]*

2.2.8.3 *[Existing text with the following amendment: In the "List of collective entries", for "Articles C11" add "3547 ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.".]*

".

2.2.9.1.2 The amendment does not apply to the English version.

2.2.9.1.3 Replace “2.2.9.1.4 to 2.2.9.1.14” by “2.2.9.1.4 to 2.2.9.1.8, 2.2.9.1.10, 2.2.9.1.11, 2.2.9.1.13 and 2.2.9.1.14”.

2.2.9.1.7 At the end of the first paragraph, add the following Note:

“***NOTE:*** *For UN 3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT, see special provision 389 in Chapter 3.3.*”.

2.2.9.1.7 Add the following new sub-paragraphs (f) and (g):

“(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 387 of Chapter 3.3) shall 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 shall be of a type proved to meet the respective testing requirements of the Manual of Tests and Criteria, part III, sub-section 38.3;

(g) Manufacturers and subsequent distributors of cells or batteries shall make available the test summary as specified in the Manual of Tests and Criteria, Part III, sub-section 38.3, paragraph 38.3.5.”.

2.2.9.1.10.4.6.5 At the end, delete “with the additional statement that: "x percent of the mixture consists of ingredients(s) of unknown hazards to the aquatic environment"”.

2.2.9.1.14 Amend the heading to read “Other substances and articles presenting a danger during carriage but not meeting the definitions of another class”.

2.2.9.1.14 The amendment to the entry for « Low hazard dithionites » does not apply to the English version.

2.2.9.1.14 After “Vehicles, engines and machinery, internal combustion", insert the following new line: “Articles containing miscellaneous dangerous goods”.

2.2.9.1.14 In the Note, delete “UN No. 2071 ammonium nitrate fertilizers,”.

2.2.9.1.14 In the Note, replace “, UN No. 3335 aviation regulated solid, n.o.s. and UN No. 3363 dangerous goods in machinery or dangerous goods in apparatus” by “and UN No. 3335 aviation regulated solid, n.o.s.”.

2.2.9.3 For “Lithium batteries M4”, add the following new entry:

“3536 LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries”.

2.2.9.3 The amendment to the title of subdivision M11 does not apply to the English version.

2.2.9.3 For “Other substances or articles presenting a danger during carriage, but not meeting the definitions of another class M11”, add the following new entries:

“ 2071 AMMONIUM NITRATE BASED FERTILIZER”
“ 3363 DANGEROUS GOODS IN MACHINERY or
3363 DANGEROUS GOODS IN APPARATUS”
“ 3548 ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS N.O.S.”.

2.2.9.3 For “Other substances or articles presenting a danger during carriage, but not meeting the definitions of another class M11”, at the top of the list of entries, delete “No collective entry available.”.

Chapter 3.1

3.1.2.2 Amend the first sentence to read as follows: “When a combination of several distinct proper shipping names are listed under a single UN number, and these are separated by “and” or ”or” in lower case or are punctuated by commas, only the most appropriate shall be shown in the transport document and package marks.”. Delete the second sentence.

3.1.2.6 (a) After “Chapter 3.3,” insert “7.1.7,”.

3.1.2.6 Sub-paragraph (b) becomes sub-paragraph (c). Add the following new sub-paragraph (b):

“(b) Unless it is already included in capital letters in the name indicated in Column (2) of Table A in Chapter 3.2, the words “TEMPERATURE CONTROLLED” shall be added as part of the proper shipping name;”.

3.1.2.8.1.1 The amendment does not apply to the English version.

3.1.2.8.1.2 Amend the first sentence to read as follows: “When a mixture of dangerous goods or articles containing dangerous goods are described by one of the “N.O.S.” or “generic” entries to which special provision 274 has been allocated in Column (6) of Table A in Chapter 3.2, not more than the two constituents which most predominantly contribute to the hazard or hazards of the mixture or of the articles need to be shown, excluding controlled substances when their disclosure is prohibited by national law or international convention.”. In the second sentence, replace “risk label” by “hazard label” (twice).

3.1.2.8.1.3 Add the following new example at the end:

“UN 3540 ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S. (pyrrolidine)”.

Chapter 3.2

3.2.1 In the explanatory text for column (3b), in the penultimate indent, delete “, 8”. Add a new indent right after to read as follows:

“- For dangerous substances or articles of Class 8, the codes are explained in 2.2.8.1.4.1;”.

3.2.1 In the explanatory text for Column (9a), in the third indent, after “with the letter ‘L’”, insert: “or the letters ‘LL’” (twice).

3.2.1 In the explanatory text for column (15), add the following new second sentence: “When no transport category has been assigned, this is indicated by the mention "-".”.

Table A

For UN Nos. 0349, 0367, 0384 and 0481, insert “347” in column (6).

For UN No. 0509, in column (9b), insert: “MP24”.

For UN Nos. 1002, 1006, 1013, 1046, 1056, 1058, 1065, 1066, 1080, 1952, 1956, 2036, 3070, 3163, 3297, 3298 and 3299, insert “660” in Column (6)”.

For UN Nos. 1011, 1049, 1075, 1954, 1965, 1969, 1971, 1972, 1978, insert “392” and delete “660” in column (6).

For UN Nos. 1011, 1075, 1965, 1969 and 1978, insert “674” in column (6).

For UN Nos. 1043, 3166 and 3171, in column (15), add:

“-

(-)”.

For UN Nos. 1363, 1386, 1398, 1435, 2217 and 2793, in column (10), insert “BK2”.

For UN No. 1744, add “TU43” in column (13).

For UN Nos. 1755 packing groups II and III, 1778 packing group II, 1779 packing group II, 1788 packing groups II and III, 1789 packing groups II and III, 1791 packing groups II and III, 1803 packing group II, 1805 packing group III, 1814 packing groups II and III, 1819 packing groups II and III, 1824 packing groups II and III, 1830 packing group II, 1832 packing group II, 1840 packing group III, 1906 packing group II, 2031 packing group II, 2581 packing group III, 2582 packing group III, 2586 packing group III, 2693 packing group III, 2796 packing group II, 3264 packing groups II and III, and 3266 packing groups II and III, add “TU42” in column (13).

For UN Nos. 2067, in column (6) delete “186”.

For UN No. 2071, in Column (2), amend the designation to read “AMMONIUM NITRATE BASED FERTILIZER”. In Column (3b), insert “M11”.

For UN No. 2071, delete “Not subject to ADR” and in column (6) insert “193”.

For UN No. 2381, delete “TP38” in column (11).

For UN Nos. 3090, 3091, 3480 and 3481, in column (6) insert “387”. In column (8), insert “P911” and “LP905 LP906”.

For UN Nos. 3091 and 3481, replace “636” by “670” in column (6).

For UN No. 3148, delete “TP39” in column (11).

For UN No. 3166, delete “312” and “385” in column (6).

For UN Nos. 3166 and 3171, insert “388” in column (6).

For UN No. 3171, delete “240” in column (6).

For UN Nos. 3223 and 3224, in column (9a), add “PP94 PP95”.

For UN No. 3302 in column (2) add at the end of the designation “, STABILIZED” and in column (6), add “386”. Insert “V8” in column (16). Insert “S4” in column (19).

For UN No. 3316, delete the second entry corresponding to packing group III. In the remaining entry, in column (5), delete “II” and insert “671” in column (6). In column (15), at the top of the cell, replace “2” by “See SP 671”.

For UN Nos. 3359 and 3373 first entry, add “-” in the upper case of column (15).

Replace the row for UN No. 3363 by the following:

(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)	(12) – (20)

(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)	(12) – (20)
3363	DANGEROUS GOODS IN MACHINERY or DANGEROUS GOODS IN APPARATUS	9	M11		9	301 672	0	E0	P907					

Pour le No ONU 3528, dans la colonne (15), insérer

« -
(D) ».

Pour le No ONU 3529, dans la colonne (15), insérer

« -
(B) ».

Pour le No ONU 3530, dans la colonne (15), insérer

« -
(E) ».

Add the following new entries:

(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.	6.1	TF3	I	6.1 +4.1	274	0	E5	P002 IBC99		MP18	T6	TP33			AT	1 (C/E)	V10		CV1 CV13 CV28	S9 S14	664
3535	TOXIC SOLID, FLAMMABLE, INORGANIC, N.O.S.	6.1	TF3	II	6.1 +4.1	274	500 g	E4	P002 IBC08	B4	MP10	T3	TP33	SGAH	TU15 TE19	AT	2 (D/E)	V11		CV13 CV28	S9 S19	64
3536	LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT lithium ion batteries or lithium metal batteries	9	M4		9	389	0	E0									- (E)					
3537	ARTICLES CONTAINING FLAMMABLE GAS, N.O.S.	2	6F		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3538	ARTICLES CONTAINING NON-FLAMMABLE, NON TOXIC GAS, N.O.S.	2	6A		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3539	ARTICLES CONTAINING TOXIC GAS, N.O.S.	2	6T		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3540	ARTICLES CONTAINING FLAMMABLE LIQUID, N.O.S.	3	F3		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3541	ARTICLES CONTAINING FLAMMABLE SOLID, N.O.S.	4.1	F4		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		

(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
3542	ARTICLES CONTAINING A SUBSTANCE LIABLE TO SPONTANEOUS COMBUSTION, N.O.S.	4.2	S6		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3543	ARTICLES CONTAINING A SUBSTANCE WHICH IN CONTACT WITH WATER EMITS FLAMMABLE GASES, N.O.S.	4.3	W3		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3544	ARTICLES CONTAINING OXIDIZING SUBSTANCE, N.O.S.	5.1	O3		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3545	ARTICLES CONTAINING ORGANIC PEROXIDE, N.O.S.	5.2	P1 or P2		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3546	ARTICLES CONTAINING TOXIC SUBSTANCE, N.O.S.	6.1	T10		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3547	ARTICLES CONTAINING CORROSIVE SUBSTANCE, N.O.S.	8	C11		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		
3548	ARTICLES CONTAINING MISCELLANEOUS DANGEROUS GOODS, N.O.S.	9	M11		See 5.2.2.1.12	274 667	0	E0	P006 LP03								4 (E)			CV13 CV28		

Chapter 3.3

3.3.1 In the third sentence, replace "such as "Damaged Lithium Batteries"" by "such as "LITHIUM BATTERIES FOR DISPOSAL"".

Special provision 23 The amendment does not apply to the English version.

Special provision 61 The amendment does not apply to the English version.

Special provision 122 Replace "risk(s)" by "hazard(s)".

Special provision 172 In the introductory sentence and in (c), replace "risk(s)" by "hazard(s)". In (a), (b) and (d) replace "risk" by "hazard".

Delete special provision 186 and add: "186 *(Deleted)*".

Special provision 188 (a) and (b) Add the following new Note;

*"**NOTE:** When lithium batteries in conformity with 2.2.9.1.7 (f) are carried in accordance with this special provision, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh (see special provision 387)."*

Special provision 188 (c) Replace "2.2.9.1.7 (a) and (e)" by "2.2.9.1.7 (a), (e), (f) if applicable and (g)".

Special provision 188 (d) Replace "protection against contact with conductive materials" by "protection against contact with electrically conductive material".

Special provision 188 (f) At the end, add the following two new sentences: "When packages are placed in an overpack, the lithium battery mark shall either be clearly visible or be reproduced on the outside of the overpack and the overpack shall be marked with the word "OVERPACK". The lettering of the "OVERPACK" mark shall be at least 12 mm high.". Add the following new Note:

*"**NOTE:** Packages containing lithium batteries packed in conformity with the provisions of Part 4, Chapter 11, packing instructions 965 or 968, Section IB of the ICAO Technical Instructions that bear the mark as shown in 5.2.1.9 (lithium battery mark) and the label shown in 5.2.2.2.2, model No. 9A shall be deemed to meet the provisions of this special provision."*

Special provision 188, in the first paragraph after (h) Add the following sentence at the end: "As used in this special provision "equipment" means apparatus for which the lithium cells or batteries will provide electrical power for its operation.".

Delete special provision 240 and add: "240 *(Deleted)*".

Special provision 250 In paragraph (a), delete: "(see Table S-3-8 of the Supplement)".

Special provision 251 Amend as follows:

In the first paragraph, replace the last sentence by:

"Such kits shall only contain dangerous goods that are permitted as:

(a) Excepted quantities not exceeding the quantity indicated by the code in column (7b) of Table A of Chapter 3.2, provided that the net quantity per inner packaging and net quantity per package are as prescribed in 3.5.1.2 and 3.5.1.3; or;

(b) Limited quantities as indicated in column (7a) of Table A of Chapter 3.2, provided that the net quantity per inner packaging does not exceed 250 ml or 250 g.".

In the second paragraph, delete the last sentence.

In the third paragraph, insert a new first sentence to read as follows: "For the purposes of completion of the transport document as set out in 5.4.1.1.1, the packing group shown on the document shall be the most stringent packing group assigned to any individual substance in the kit.".

Special provision 280 The amendment does not apply to the English version.

Special provision 290 (b) In the first sentence, replace "risk" by "hazard".

Special provision 293 (b) After "Safety matches are", replace "matches which" by "matches that".

Special provision 307 Amend to read as follows:

"307 This entry may only be used for ammonium nitrate based fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39 subject to the restrictions of 2.2.51.2.2, thirteenth indent. When used in the said Section 39, the term "competent authority" means the competent authority of the country of origin. If the country of origin is not a Contracting Party to ADR, the classification and conditions of carriage shall be recognized by the competent authority of the first country Contracting Party to ADR reached by the consignment.".

Special provision 310 In the first paragraph, replace "cells and batteries" by "cells or batteries", twice, and add "or LP905 of 4.1.4.3, as applicable" at the end.

Delete special provision 312 and add: "312 *(Deleted)*".

Special provision 339 (b) The amendment does not apply to the English version.

Special provision 361 (b) The amendment does not apply to the English version.

Special provision 363 Add the following new introductory sentence: "This entry may only be used when the conditions of this special provision are met. No other requirements of ADR apply.".

Special provision 363 (f) At the end, replace "requirements of 2.2.9.1.7" by "provisions of 2.2.9.1.7".

Special provision 363 Delete the introductory text under (g). Renumber existing (i) to (vi) under current (g) as (g) to (l). Amend (*l*) to read as follows:

"(*l*) When the engine or machinery contains more than 1 000 *l* of liquid fuels, for UN No. 3528 and UN No. 3530, or the fuel tank has a water capacity of more than 1 000 *l*, for UN No. 3529:

- A transport document in accordance with 5.4.1 is required. This transport document shall contain the following additional statement "Transport in accordance with special provision 363";

- When the carriage is known beforehand to pass through a tunnel with restrictions for carriage of dangerous goods, the transport unit shall display orange-coloured plates according to 5.3.2 and the tunnel restrictions according to 8.6.4 apply.".

Special provision 363 Add a new sub-paragraph (m) to read as follows:

"(m) The requirements specified in packing instruction P005 of 4.1.4.1 shall be met.".

Special provision 369 In the first paragraph, replace “risks” by “hazards”. In the third paragraph, replace “risk” by “hazard”.

Special provision 376 Amend the text after the third paragraph to read as follows:

“Cells and batteries shall be packed in accordance with packing instructions P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.

Cells and batteries identified as damaged or defective and liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage shall be packed and carried in accordance with packing instruction P911 of 4.1.4.1 or LP906 of 4.1.4.3, as applicable. Alternative packing and/or carriage conditions may be authorized by the competent authority of any ADR Contracting Party who may also recognize an approval granted by the competent authority of a country which is not an ADR Contracting Party provided that this approval has been granted in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions. In both cases the cells and batteries are assigned to transport category 0.

Packages shall be marked "DAMAGED/DEFECTIVE LITHIUM-ION BATTERIES" or "DAMAGED/DEFECTIVE LITHIUM METAL BATTERIES", as applicable.

The transport document shall include the following statement “Transport in accordance with special provision 376”.

If applicable, a copy of the competent authority approval shall accompany the carriage.”.

Special provision 377 In the second paragraph, replace “requirements of 2.2.9.1.7 (a) to (e)” by “provisions of 2.2.9.1.7 (a) to (g)”.

Delete special provision 385 and add:

“385 *(Deleted)*”.

Special provision 386 In the first sentence, after “2.2.41.1.17,”, insert “7.1.7,”.

Special provision 636 Amend to read as follows:

“636 Up to the intermediate processing facility, lithium cells and batteries with a gross mass of not more than 500 g each, lithium ion cells with a Watt-hour rating of not more than 20 Wh, lithium ion batteries with a Watt-hour rating of not more than 100 Wh, lithium metal cells with a lithium content of not more than 1 g and lithium metal batteries with an aggregate lithium content of not more than 2 g, not contained in equipment, collected and handed over for carriage for sorting, disposal or recycling, together with or without other non-lithium cells or batteries**,** are not subject to the other provisions of ADR including special provision 376 and 2.2.9.1.7, if the following conditions are met:

(a) The cells and batteries are packed according to packing instruction P909 of 4.1.4.1 except for the additional requirements 1 and 2;

(b) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries per transport unit does not exceed 333 kg;

NOTE: *The total quantity of lithium cells and batteries in the mix may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*

(c) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate.”.

Special provision 660 Amend to read as follows:

"660 For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 need not be applied when carried for disposal, recycling, repair, inspection, maintenance or from where they are manufactured to a vehicle assembly plant, provided the conditions described in special provision 392 are met. This also applies for mixtures of gases subject to special provision 392 and gases of group A subject to this special provision.".

Special provision 663 Under "General provisions:", replace "risk" by "hazard" (twice).

Special provision 666 Amend the first paragraph to read as follows:

"Vehicles and battery powered equipment, referred to by special provision 388, when carried as a load, as well as any dangerous goods they contain that are necessary for their operation or the operation of their equipment, are not subject to any other provisions of ADR, provided the following conditions are met:".

Special provision 667 In (a), (b), (b) (i) and (b) (ii), replace "or machinery" by ", machinery or article" and add the following new sub-paragraph (c):

"(c) The procedures described in (b) also apply to damaged lithium cells or batteries in vehicles, engines, machinery or articles.".

Special provision 667 (a) and (b) Replace "requirements of 2.2.9.1.7" by "provisions of 2.2.9.1.7".

3.3.1 Add the following new special provisions:

"193 This entry may only be used for ammonium nitrate based compound fertilizers. They shall be classified in accordance with the procedure as set out in the Manual of Tests and Criteria, Part III, Section 39. Fertilizers meeting the criteria for this UN number are not subject to the requirements of ADR.".

"301 This entry only applies to machinery or apparatus containing dangerous goods as a residue or an integral element of the machinery or apparatus. It shall not be used for machinery or apparatus for which a proper shipping name already exists in Table A of Chapter 3.2. Machinery and apparatus carried under this entry shall only contain dangerous goods which are authorized to be carried in accordance with the provisions of Chapter 3.4 (Limited quantities). The quantity of dangerous goods in machinery or apparatus shall not exceed the quantity specified in Column (7a) of Table A of Chapter 3.2 for each item of dangerous goods contained. If the machinery or apparatus contains more than one item of dangerous goods, the individual dangerous goods shall be enclosed to prevent them reacting dangerously with one another during carriage (see 4.1.1.6). When it is required to ensure liquid dangerous goods remain in their intended orientation, orientation arrows shall be displayed on at least two opposite vertical sides with the arrows pointing in the correct direction in accordance with 5.2.1.10.

NOTE: *In this special provision the reference to "a proper shipping name which already exists" excludes specific n.o.s. entries for UN Nos. 3537 to 3548.*".

"387 Lithium batteries in conformity with 2.2.9.1.7 (f) containing both primary lithium metal cells and rechargeable lithium ion cells shall be assigned to UN Nos. 3090 or 3091 as appropriate. When such batteries are carried in accordance with special provision 188, the total lithium content of all lithium metal cells contained in the battery shall not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery shall not exceed 10 Wh.".

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

Vehicles powered by a fuel cell engine shall be assigned to 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, carried with the battery(ies) installed.

Other vehicles which contain an internal combustion engine shall be assigned to the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, carried with the battery(ies) installed.

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it shall 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 carried 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 carried 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 shall be assigned to the entries 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.

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, shall be securely installed in the vehicle and are not otherwise subject to ADR. However, lithium batteries shall meet the provisions of 2.2.9.1.7, except as otherwise provided for in special provision 667.

Where a lithium battery installed in a vehicle or equipment is damaged or defective, the vehicle or equipment shall be carried in accordance with the conditions defined in special provision 667 (c).".

"389 This entry only applies to cargo transport units in which lithium ion batteries or lithium metal batteries are installed and which are designed only to provide power external to the unit. The lithium batteries shall meet the provisions of 2.2.9.1.7 (a) to (g) 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 carriage. 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 ADR. Dangerous goods not necessary for the safe and proper operation of the cargo transport unit shall not be carried 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 bear orange-coloured plates in accordance with 5.3.2.2 and placards in accordance with 5.3.1.1 on two opposing sides.".

"391 *(Reserved)*".

"392 For the carriage of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of 4.1.4.1 and Chapter 6.2 need not be applied when carried 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 shall 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
CNG and LNG tanks	
ECE Regulation No. 110	Uniform provisions concerning the approval of: I. Specific components of motor vehicles using compressed natural gas (CNG) and/or liquefied natural gas (LNG) 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) and/or liquefied natural gas (LNG) 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	Road vehicles -- Compressed natural gas (CNG) fuel system components – several parts as applicable
ANSI NGV 2	Compressed natural gas vehicle fuel containers
CSA 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)
CSA 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

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 carried;

(b) The fuel gas containment systems shall be leakproof and shall 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 shall only be carried in salvage pressure receptacles in conformity with ADR.*

(c) If a fuel gas containment system is equipped with two valves or more integrated in line, the two valves shall be closed as to be gastight under normal conditions of carriage. If only one valve exists or only one valve works, all openings with the exception of the opening of the pressure relief device shall be closed as to be gastight under normal conditions of carriage;

(d) Fuel gas containment systems shall be carried 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 carriage. The fuel gas containment system shall be secured in order to prevent slipping, rolling or vertical movement;

(e) Valves shall be protected by one of the methods described in 4.1.6.8 (a) to (e);

(f) Except for the case of fuel gas containment systems removed for disposal, recycling, repair, inspection or maintenance, they shall be filled with not more than 20% of their nominal filling ratio or nominal working pressure, as applicable;

(g) Notwithstanding the provisions of Chapter 5.2, when fuel gas containment systems are consigned in a handling device, marks and labels may be affixed to the handling device; and

(h) Notwithstanding the provisions of 5.4.1.1.1 (f) 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”.”.

“670 (a) Lithium cells and batteries installed in equipment from private households collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of ADR including special provision 376 and 2.2.9.1.7 when:

(i) They are not the main power source for the operation of the equipment in which they are contained;

(ii) The equipment in which they are contained does not contain any other lithium cell or battery used as the main power source; and

(iii) They are afforded protection by the equipment in which they are contained.

Examples for cells and batteries covered by this paragraph are button cells used for data integrity in household appliances (e.g. refrigerators, washing machines, dishwashers) or in other electrical or electronic equipment;

(b) Up to the intermediate processing facility lithium cells and batteries contained in equipment from private households not meeting the requirements of (a) collected and handed over for carriage for depollution, dismantling, recycling or disposal are not subject to the other provisions of ADR including special provision 376 and 2.2.9.1.7, if the following conditions are met:

(i) The equipment is packed in accordance with packing instruction P909 of 4.1.4.1 except for the additional requirements 1 and 2; or it is packed in strong outer packagings, e.g. specially designed collection receptacles, which meet the following requirements:

- The packagings shall be constructed of suitable material and be of adequate strength and design in relation to the packaging capacity and its intended use. The packagings need not meet the requirements of 4.1.1.3;

- Appropriate measures shall be taken to minimize the damage of the equipment when filling and handling the packaging, e.g. use of rubber mats; and

- The packagings shall be constructed and closed so as to prevent any loss of contents during carriage, e.g. by lids, strong inner liners, covers for transport. Openings designed for filling are acceptable if they are constructed so as to prevent loss of content;

(ii) A quality assurance system is in place to ensure that the total amount of lithium cells and batteries per transport unit does not exceed 333 kg;

NOTE: *The total quantity of lithium cells and batteries in the equipment from private households may be assessed by means of a statistical method included in the quality assurance system. A copy of the quality assurance records shall be made available to the competent authority upon request.*

(iii) Packages are marked "LITHIUM BATTERIES FOR DISPOSAL" or "LITHIUM BATTERIES FOR RECYCLING" as appropriate. If equipment containing lithium cells or batteries is carried unpackaged or on pallets in accordance with packing instruction P909 (3) of 4.1.4.1, this mark may alternatively be affixed to the external surface of the vehicles or containers).

NOTE: *"Equipment from private households" means equipment which comes from private households and equipment which comes from commercial, industrial, institutional and other sources which, because of its nature and quantity, is similar to that from private households. Equipment likely to be used by both private households and users other than private households shall in any event be considered to be equipment from private households.".*

"671 For the purposes of the exemption related to quantities carried per transport unit (see 1.1.3.6), the transport category shall be determined in relation to the packing group (see paragraph 3 of special provision 251):

- Transport category 3 for kits assigned to packing group III;

- Transport category 2 for kits assigned to packing group II;

- Transport category 1 for kits assigned to packing group I.".

"672 Machinery and apparatus carried under this entry and in conformity with special provision 301 are not subject to any other provision of ADR provided they are either:

- packed in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging's capacity and its intended use, and meeting the applicable requirements of 4.1.1.1; or

- carried without outer packaging if the machinery or apparatus is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection.".

"673 *(Reserved)*".

"674 This special provision applies to periodic inspection and test of over-moulded cylinders as defined in 1.2.1.

Over-moulded cylinders subject to 6.2.3.5.3.1 shall be subject to periodic inspection and test in accordance with 6.2.1.6.1, adapted by the following alternative method:

- Substitute test required in 6.2.1.6.1 d) by alternative destructive tests;

- Perform specific additional destructive tests related to the characteristics of over-moulded cylinders.

The procedures and requirements of this alternative method are described below.

Alternative method:

(a) General

The following provisions apply to over-moulded cylinders produced serially and based on welded steel cylinders in accordance with EN 1442:2017, EN 14140:2014 + AC:2015 or annex I, parts 1 to 3 to Council Directive 84/527/EEC. The design of the over-moulding shall prevent water from penetrating on to the inner steel cylinder. The conversion of the steel cylinder to an over-moulded cylinder shall comply with the relevant requirements of EN 1442:2017 and EN 14140:2014 + AC:2015.

Over-moulded cylinders shall be equipped with self-closing valves.

(b) Basic population

A basic population of over-moulded cylinders is defined as the production of cylinders from only one over-moulding manufacturer using new inner cylinders manufactured by only one manufacturer within one calendar year, based on the same design type, the same materials and production processes.

(c) Sub-groups of a basic population

Within the above defined basic population, over-moulded cylinders belonging to different owners shall be separated into specific sub-groups, one per owner.

If the whole basic population is owned by one owner, the sub-group equals the basic population.

(d) Traceability

Inner steel cylinder marks in accordance with 6.2.3.9 shall be repeated on the over-moulding. In addition, each over-moulded cylinder shall be fitted with an individual resilient electronic identification device. The detailed characteristics of the over-moulded cylinders shall be recorded by the owner in a central database. The database shall be used to:

- Identify the specific sub-group;

- Make available to inspection bodies, filling centres and competent authorities the specific technical characteristics of the cylinders consisting of at least the following: serial number, steel cylinder production batch, over-moulding production batch, date of over-moulding;

- Identify the cylinder by linking the electronic device to the database with the serial number;

- Check individual cylinder history and determine measures (e.g. filling, sampling, retesting, withdrawal);

- Record performed measures including the date and the address of where it was done.

The recorded data shall be kept available by the owner of the over-moulded cylinders for the entire life of the sub-group.

(e) Sampling for statistical assessment

The sampling shall be random among a sub-group as defined in sub-paragraph (c). The size of each sample per sub-group shall be in accordance with the table in sub-paragraph (g).

(f) Test procedure for destructive testing

The inspection and test required by 6.2.1.6.1 shall be carried out except (d) which shall be substituted by the following test procedure:

- Burst test (according to EN 1442:2017 or EN 14140:2014 + AC:2015).

In addition, the following tests shall be performed:

- Adhesion test (according to EN 1442:2017 or EN 14140:2014 + AC:2015);

- Peeling and Corrosion tests (according to EN ISO 4628-3:2016).

Adhesion test, peeling and corrosion tests, and burst test shall be performed on each related sample according to the table in sub-paragraph (g) and shall be conducted after the first 3 years in service and every 5 years thereafter.

(g) Statistical evaluation of test results – Method and minimum requirements

The procedure for statistical evaluation according to the related rejection criteria is described in the following.

Test interval (years)	**Type of test**	**Standard**	**Rejection criteria**	**Sampling out of a sub-group**
After 3 years in service (see (f))	Burst test	EN 1442:2017	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart $\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)$ [a] No individual test result shall be less than the test pressure	$3\sqrt[3]{Q}$ or Q/200 whichever is lower, and with a minimum of 20 per sub-group (Q)
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of Polyurethane	ISO 2859-1:1999 + A1:2011 EN 1442:2017 EN 14140:2014 + AC:2015	Adhesion value > 0.5 N/mm²	See ISO 2859-1:1999 + A1:2011 applied to Q/1000
Every 5 years thereafter (see (f))	Burst test	EN 1442:2017	Burst pressure point of the representative sample must be above the lower limit of tolerance interval on the Sample Performance Chart	$6\sqrt[3]{Q}$ or Q/100 whichever is lower, and

			$\Omega_m \geq 1 + \Omega_s \times k3(n;p;1-\alpha)$ [a] No individual test result shall be less than the test pressure	with a minimum of 40 per sub-group (Q)
	Peeling and corrosion	EN ISO 4628-3:2016	Max corrosion grade: Ri2	Q/1 000
	Adhesion of Polyurethane	ISO 2859-1:1999 + A1:2011 EN 1442:2017 EN 14140:2014 + AC:2015	Adhesion value > 0.5 N/mm²	See ISO 2859-1:1999 + A1:2011 applied to Q/1000

[a] *Burst pressure point (BPP) of the representative sample is used for the evaluation of test results by using a Sample Performance Chart:*

Step 1: Determination of the burst pressure point (BPP) of a representative sample

Each sample is represented by a point whose coordinates are the mean value of burst test results and the standard deviation of burst test results, each normalised to the relevant test pressure.

$$BPP: (\Omega_s = \frac{s}{PH} ; \Omega_m = \frac{x}{PH})$$

with

x: sample mean value;

s: sample standard deviation;

PH: test pressure

Step 2: Plotting on a Sample Performance Chart

Each BPP is plotted on a Sample Performance Chart with following axis:

- *Abscissa : Standard Deviation normalised to test pressure (Ω_s)*
- *Ordinate : Mean value normalised to test pressure (Ω_m)*

Step 3: Determination of the relevant lower limit of tolerance interval in the Sample Performance Chart

Results for burst pressure shall first be checked according to the Joint Test (multidirectional test) using a significance level of α=0.05 (see paragraph 7 of ISO 5479:1997) to determine whether the distribution of results for each sample is normal or non-normal.

- *For a normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.1.*
- *For a non-normal distribution, the determination of the relevant lower limit of tolerance is given in step 3.2.*

Step 3.1: Lower limit of tolerance interval for results following a normal distribution

In accordance with the standard ISO 16269-6:2014, and considering that the variance is unknown, the unilateral statistical tolerance interval shall be considered for a confidence level of 95% and a fraction of population equal to 99.9999%.

By application in the Sample Performance Chart, the lower limit of tolerance interval is represented by a line of constant survival rate defined by the formula:

$$\boldsymbol{\Omega_m = 1 + \Omega_s \times k3(n;p;1-\alpha)}$$

with

k3: factor function of n, p and 1-α;

p: proportion of the population selected for the tolerance interval (99.9999%);

1- α: confidence level (95%);

n: sample size.

The value for k3 dedicated to Normal Distributions shall be taken from the table at end of Step 3.

Step 3.2: Lower limit of tolerance interval for results following a non-normal distribution

The unilateral statistical tolerance interval shall be calculated for a confidence level of 95% and a fraction of population equal to 99.9999%.

The lower limit of tolerance is represented by a line of constant survival rate defined by the formula given in previous step 3.1, with factors k3 based and calculated on the properties of a Weibull Distribution.

The value for k3 dedicated to Weibull Distributions shall be taken from the table below at end of Step 3.

Table for k3 *p=99.9999% and (1- α)=0.95*		
Sample size ***n***	***Normal distribution*** ***k3***	***Weibull distribution*** ***k3***
20	*6.901*	*16.021*
22	*6.765*	*15.722*
24	*6.651*	*15.472*
26	*6.553*	*15.258*
28	*6.468*	*15.072*
30	*6.393*	*14.909*
35	*6.241*	*14.578*
40	*6.123*	*14.321*
45	*6.028*	*14.116*
50	*5.949*	*13.947*
60	*5.827*	*13.683*
70	*5.735*	*13.485*
80	*5.662*	*13.329*
90	*5.603*	*13.203*
100	*5.554*	*13.098*
150	*5.393*	*12.754*
200	*5.300*	*12.557*
250	*5.238*	*12.426*
300	*5,193*	*12.330*
400	*5.131*	*12.199*

Table for k3 *p=99.9999% and (1- α)=0.95*		
Sample size ***n***	***Normal distribution*** ***k3***	***Weibull distribution*** ***k3***
500	*5.089*	*12.111*
1000	*4.988*	*11.897*
∞	*4.753*	*11.408*

NOTE: *If sample size is between two values, the closest lower sample size shall be selected.*

(h) Measures if the acceptance criteria are not met

If a result of the burst test, peeling and corrosion test or adhesion test does not comply with the criteria detailed in the table in paragraph (g), the affected sub-group of over-moulded cylinders shall be segregated by the owner for further investigations and not be filled or made available for transport and use.

In agreement with the competent authority or the Xa-body which issued the design approval, additional tests shall be performed to determine the root cause of the failure.

If the root cause cannot be proved to be limited to the affected sub-group of the owner, the competent authority or the Xa-body shall take measures concerning the whole basic population and potentially other years of production.

If the root cause can be proved to be limited to a part of the affected sub-group, not affected parts may be authorized by the competent authority to return to service. It shall be proved that no individual over-moulded cylinder returning to service is affected.

(i) Filling centre requirements

The owner shall make available to the competent authority documentary evidence that the filling centres:

- Comply with the provisions of packing instruction P200 (7) of 4.1.4.1 and that the requirements of the standard on pre-fill inspections referenced in table P200 (11) of 4.1.4.1 are fulfilled and correctly applied;

- Have the appropriate means to identify over-moulded cylinders through the electronic identification device;

- Have access to the database as defined in (d);

- Have the capacity to update the database;

- Apply a quality system, according to the standard ISO 9000 (series) or equivalent, certified by an accredited independent body recognized by the competent authority.".

Chapter 4.1

Under the heading of the Chapter, insert the following Note:

"***NOTE:*** *Packagings, including IBCs and large packagings, marked in accordance with 6.1.3, 6.2.2.7, 6.2.2.8, 6.2.2.9, 6.2.2.10, 6.3.4, 6.5.2 or 6.6.3 but which were approved in a country which is not Contracting Party to ADR may nevertheless be used for carriage under ADR.*".

4.1.1.11 The amendment does not apply to the English version.

4.1.1.17 Delete and insert “4.1.1.17 *(Deleted)*”.

4.1.4.1, packing instruction P001 Under “Composite packagings”, in the first line, replace “with outer steel or aluminium drum” by “with outer steel, aluminium or plastics drum” and add “, 6HH1” after “6HB1”.

4.1.4.1, packing instruction P001 Under “Composite packagings”, in the second line, delete “, plastics” after “fibre”. Delete “6HH1,” after “6HG1”.

4.1.4.1, packing instruction P200 In paragraph (10), in special packing provision va, add “or EN ISO 15996:2017” after “EN ISO 15996:2005 + A1:2007” (twice).

4.1.4.1, packing instruction P200 In paragraph (11), in the table, delete the first two rows (EN 1919:2000 and EN 1920:2000) and add the following new row after the row for EN 13365:2002 + A1:2005:

(7)	EN ISO 24431:2016	Gas cylinders - Seamless, welded and composite cylinders for compressed and liquefied gases (excluding acetylene) - Inspection at time of filling

4.1.4.1, packing instruction P200 In paragraph (11), in the Table, in column “Reference”, replace “EN 1439:2008 (except 3.5 and Annex G)” by “EN 1439:2017”.

4.1.4.1, packing instruction P200 In paragraph (11), in the Table, after the row for “EN 1439:2017”, insert the following standard:

(7) and (10) ta (b)	EN 13952:2017	LPG equipment and accessories – Filling operations for LPG cylinders

4.1.4.1, packing instruction P200 In paragraph (11), in the Table, delete the row for standard “EN 12755:2000”.

4.1.4.1, packing instruction P200 In paragraph (12), in 2.1, replace “EN 1439:2008” by: “EN 1439:2017 and EN 13952:2017”.

4.1.4.1, packing instruction P200 In paragraph (13), under 2.1, replace “EN 1919:2000, EN 1920:2000” by “EN ISO 24431:2016”.

4.1.4.1, packing instruction P520, additional requirement 4 Replace “risk” by “hazard”.

4.1.4.1, packing instruction P520 Add the following new special packing provisions PP94 and PP95:

“PP94 Very small amounts of energetic samples of 2.1.4.3 may be carried under UN No. 3223 or UN No. 3224, as appropriate, provided that:

1. Only combination packagings with outer packagings 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 grams and millilitres does not exceed 20; and

5. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall 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.

PP95 Small amounts of energetic samples of 2.1.4.3 may be carried under UN No. 3223 or UN No. 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 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 28 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 grams and millilitres does not exceed 56; and

6. When dry ice or liquid nitrogen is optionally used as a coolant for quality control measures, the requirements of 5.5.3 are complied with. Interior supports shall be provided to secure the inner packagings in their original position. The inner and outer packagings shall 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.”.

4.1.4.1, packing instruction P620 In additional requirement 3., at the end, delete “and temperatures in the range -40°C to +55°C” and add the following new sentence: “This primary receptacle or secondary packaging shall also be capable of withstanding temperatures in the range -40 °C to +55 °C.”.

4.1.4.1, packing instruction P801, additional requirement 2 Replace “non conductive” by “electrically non-conductive”.

4.1.4.1, packing instruction P901 Under “Additional requirements”, delete “not exceed either 250 ml or 250 g and shall”.

4.1.4.1, packing instruction P902 In the paragraph under “Unpackaged articles:”, amend the end of the sentence to read: “when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.”.

4.1.4.1, packing instruction P903 Before the introductory sentence that starts “The following packagings…”, insert a new sentence to read as follows: “For the purpose of this packing instruction, “equipment” means apparatus for which the lithium cells or batteries will provide electrical power for its operation.”.

4.1.4.1, packing instruction P903 (3) Delete the last sentence.

4.1.4.1, packing instruction P906 (2) The amendment does not apply to the English version.

4.1.4.1, packing instruction P908 In paragraphs 2 and 4, replace “non-conductive” by “electrically non-conductive”.

4.1.4.1, packing instruction P909 In paragraphs 1 (c) and 2 (b), in the fourth indent of additional requirement 2 and in additional requirement 3, replace “non-conductive” by “electrically non-conductive”.

4.1.4.1, packing instruction P910 In the introductory sentence, replace “cells and batteries” by “cells or batteries”, twice.

4.1.4.1, packing instruction P910 In paragraphs (1) (c), (1) (d), (2) (c), and in the fourth indent of the additional requirements, replace “non-conductive” by “electrically non-conductive”.

4.1.4.1, packing instruction R001 In Note 2, replace “risk” by “hazard”.

4.1.4.1 Add the following new packing instruction P006:

P006	**PACKING INSTRUCTION**	**P006**
This instruction applies to UN Nos. 3537 to 3548.		
(1)	The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2) Packagings shall conform to the packing group II performance level.	
(2)	In addition, for robust articles the following packagings are authorized: 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 shall meet the provisions of 4.1.1.1, 4.1.1.2, 4.1.1.8 and 4.1.3 in order to achieve a level of protection that is at least equivalent to that provided by Chapter 6.1. Articles may be carried unpackaged or on pallets when the dangerous goods are afforded equivalent protection by the article in which they are contained.	
(3)	Additionally, the following conditions shall be met: (a) Receptacles within articles containing liquids or solids shall be constructed of suitable materials and secured in the article in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the article itself or the outer packaging; (b) Receptacles containing liquids with closures shall be packed with their closures correctly oriented. The receptacles shall in addition conform to the internal pressure test provisions of 6.1.5.5; (c) Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials shall be properly secured. Any leakage of the contents shall not substantially impair the protective properties of the article or of the outer packaging; (d) Receptacles within articles containing gases shall meet the requirements of Section 4.1.6 and Chapter 6.2 as appropriate or be capable of providing an equivalent level of protection as packing instructions P200 or P208; (e) Where there is no receptacle within the article, the article shall fully enclose the dangerous substances and prevent their release under normal conditions of carriage.	
(4)	Articles shall be packed to prevent movement and inadvertent operation during normal conditions of carriage.	

4.1.4.1 Add the following new packing instruction P907:

P907	**PACKING INSTRUCTION**	**P907**
This instruction applies to UN No. 3363.		
If the machinery or apparatus is constructed and designed so that the receptacles containing the dangerous goods are afforded adequate protection, an outer packaging is not required. Dangerous goods in machinery or apparatus shall otherwise be packed in outer packagings constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use, and meeting the applicable requirements of **4.1.1.1.** Receptacles containing dangerous goods shall conform to the general provisions in 4.1.1, except that 4.1.1.3, 4.1.1.4, 4.1.1.12 and 4.1.1.14 do not apply. For non-flammable, non-toxic gases, the inner cylinder or receptacle, its contents and filling ratio shall be to the satisfaction of the competent authority of the country in which the cylinder or receptacle is filled. In addition, the manner in which receptacles are contained within the machinery or apparatus, shall be such that under normal conditions of carriage, damage to receptacles containing the dangerous goods is unlikely; and in the event of damage to receptacles containing solid or liquid dangerous goods, no leakage of the dangerous goods from the machinery or apparatus is possible (a leakproof liner may be used to satisfy this requirement). Receptacles containing dangerous goods shall be so installed, secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the machinery or apparatus during normal conditions of carriage. Cushioning material shall not react dangerously with the content of the receptacles. Any leakage of the contents shall not substantially impair the protective properties of the cushioning material.		

4.1.4.1 Add the following new packing instruction P911:

P911	**PACKING INSTRUCTION**	**P911**

This instruction applies to damaged or defective cells and batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.

The following packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

For cells and batteries and equipment containing cells and batteries:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);

Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);

Jerricans (3A2, 3B2, 3H2)

The packagings shall conform to the packing group I performance level.

(1) The packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the cells or batteries:

(a) The outside surface temperature of the completed package shall not have a temperature of more than 100°C. A momentary spike in temperature up to 200°C is acceptable;

(b) No flame shall occur outside the package;

(c) No projectiles shall exit the package;

(d) The structural integrity of the package shall be maintained; and

(e) The packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.

(2) The additional packaging performance requirements shall be verified by a test as specified by the competent authority of any ADR Contracting Party who may also recognize a test specified by the competent authority of a country which is not an ADR Contracting Party provided that this test has been specified in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions[a].

A verification report shall be available on request. As a minimum requirement, the cell or battery name, the cell or battery number, the mass, type, energy content of the cells or batteries, the packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.

(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall 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.

Additional requirement:

Cells or batteries shall be protected against short circuit.

[a] *The following criteria, as relevant, may be considered to assess the performance of the packaging:*

(a) The assessment shall be done under a quality management system (as described e.g. in section 2.2.9.1.7 (e)) allowing for the traceability of tests results, reference data and characterization models used;

(b) The list of hazards expected in case of thermal run-away for the cell or battery type, in the condition it is carried (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of possible hazards for lithium cells or batteries (rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;

P911	PACKING INSTRUCTION	P911

(c) The mitigating effects of the packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density [kg·m^{-3}], specific heat capacity [J·kg^{-1}·K^{-1}], heating value [kJ·kg^{-1}], thermal conductivity [W·m^{-1}·K^{-1}], melting temperature and flammability temperature [K], heat transfer coefficient of the outer packaging [W·m^{-2}·K^{-1}], ...);

(d) The test and any supporting calculations shall assess the result of a thermal run-away of the cell or battery inside the packaging in the normal conditions of carriage;

(e) In case the SOC of the cell or battery is not known, the assessment used, shall be done with the highest possible SOC corresponding to the cell or battery use conditions;

(f) The surrounding conditions in which the packaging may be used and carried shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the packaging;

(g) The tests or the model calculation shall consider the worst case scenario for the thermal run-away triggering and propagation inside the cell or battery; this scenario includes the worst possible failure in the normal carriage condition, the maximum heat and flame emissions for the possible propagation of the reaction;

(h) These scenarios shall be assessed over a period of time long enough to allow all the possible consequences to occur (e.g. 24 hours).

4.1.4.2, packing instruction IBC520 In the second line, after "4.1.7.2.", insert a new sentence to read as follows: "The formulations listed below may also be carried packed in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.".

4.1.4.2, packing instruction IBC520 For UN No. 3109, under the entry «tert-Butyl hydroperoxide, not more than 72% with water», add a new line to read:

Type of IBC	*Maximum quantity (litres/kg)*	*Control Temperature*	*Emergency Temperature*
31HA1	1 000		

4.1.4.2, packing instruction IBC520 Add the following new entries:

UN No.	*Organic peroxide*	*Type of IBC*	*Maximum quantity (litres/kg)*	*Control Temperature*	*Emergency Temperature*
3109	2,5-Dimethyl-2,5-di(tert-butylperoxy)hexane, not more than 52% in diluent type A	31HA1	1000		
3109	3,6,9-Triethyl-3,6,9-trimethyl-1,4,7-triperoxonane not more than 27% in diluent type A	31HA1	1000		
3119	tert-Amyl peroxy-2-ethylhexanoate, not more than 62% in diluent type A	31HA1	1000	+15 °C	+20 °C

4.1.4.3, packing instruction LP902 Under "Packaged articles", replace "Packagings conforming to the packing group III performance level." by:

"Rigid large packagings conforming to the packing group III performance level, made of:

steel (50A);
aluminium (50B);

metal other than steel or aluminium (50N);
rigid plastics (50H);
natural wood (50C);
plywood (50D);
reconstituted wood (50F);
rigid fibreboard (50G).".

4.1.4.3, packing instruction LP902 In the paragraph under "Unpackaged articles:", amend the end of the sentence to read: "when moved to, from, or between where they are manufactured and an assembly plant including intermediate handling locations.".

4.1.4.3, packing instruction LP903 In the second sentence, replace ", including for a battery contained in equipment" by "and for a single item of equipment containing batteries,". Amend the last sentence before the additional requirements to read as follows: "The battery or the equipment shall be packed so that the battery or the equipment is protected against damage that may be caused by its movement or placement within the large packaging."

4.1.4.3, packing instruction LP904 Amend as follows:

In the first sentence, after "or defective batteries", add "and to single items of equipment containing damaged or defective cells and batteries". At the end of the first sentence, delete ", including those contained in equipment".

Amend the second sentence to read as follows: "The following large packagings are authorized for a single damaged or defective battery and for a single item of equipment containing damaged or defective cells and batteries, provided the general provisions of **4.1.1** and **4.1.3** are met.".

In the third sentence, replace "For batteries and equipment containing batteries, large packagings made of:" by "For batteries and equipment containing cells and batteries:".

Before "steel (50A)", insert the following new line:

"Rigid large packagings conforming to the packing group II performance level, made of:".

After "plywood (50D)", delete "Packagings shall conform to the packing group II performance level.".

In 1., amend the beginning of the first sentence to read as follows: "The damaged or defective battery or equipment containing such cells or batteries shall be ...".

In 2., amend the beginning of the sentence to read "The inner packaging". Replace "non-conductive" by "electrically non-conductive".

In 4., after "movement of the battery" add "or the equipment". Replace "non-conductive" by "electrically non-conductive".

In the last sentence before the additional requirement, replace "For leaking batteries" by "For leaking cells and batteries".

In the additional requirement, replace "Batteries" by "Cells and batteries".

4.1.4.3 Add the following new packing instruction LP03:

LP03	**PACKING INSTRUCTION**	**LP03**
This instruction applies to UN Nos. 3537 to 3548.		
(1) The following large packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met: Rigid large packagings conforming to the packing group II performance level made of: steel (50A); aluminium (50B); metal other than steel or aluminium (50N); rigid plastics (50H); natural wood (50C); plywood (50D); reconstituted wood (50F); rigid fibreboard (50G). (2) Additionally, the following conditions shall be met: (a) Receptacles within articles containing liquids or solids shall be constructed of suitable materials and secured in the article in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents into the article itself or the outer packaging; (b) Receptacles containing liquids with closures shall be packed with their closures correctly oriented. The receptacles shall in addition conform to the internal pressure test provisions of 6.1.5.5; (c) Receptacles that are liable to break or be punctured easily, such as those made of glass, porcelain or stoneware or of certain plastics materials shall be properly secured. Any leakage of the contents shall not substantially impair the protective properties of the article or of the outer packaging; (d) Receptacles within articles containing gases shall meet the requirements of Section 4.1.6 and Chapter 6.2 as appropriate or be capable of providing an equivalent level of protection as packing instructions P200 or P208; and (e) Where there is no receptacle within the article, the article shall fully enclose the dangerous substances and prevent their release under normal conditions of carriage. (3) Articles shall be packed to prevent movement and inadvertent operation during normal conditions of carriage.		

4.1.4.3 Add the new following packing instruction LP905:

LP905	**PACKING INSTRUCTION**	**LP905**
This instruction applies to UN Nos. 3090, 3091, 3480 and 3481 production runs consisting of not more than 100 cells and batteries and to pre-production prototypes of cells and batteries when these prototypes are carried for testing.		
The following large packagings are authorized for a single battery and for a single item of equipment containing cells or batteries, provided that the general provisions of **4.1.1** and **4.1.3** are met: (1) For a single battery: Rigid large packagings conforming to the packing group II performance level, made of: steel (50A); aluminium (50B); metal other than steel or aluminium (50N); rigid plastics (50H); natural wood (50C); plywood (50D); reconstituted wood (50F); rigid fibreboard (50G).		

LP905	PACKING INSTRUCTION	LP905

Large packagings shall also meet the following requirements:

(a) A battery of different size, shape or mass may be packed in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;

(b) The battery shall be packed in an inner packaging and placed inside the outer packaging;

(c) The inner packaging shall be completely surrounded by sufficient non-combustible and electrically non-conductive thermal insulation material to protect against a dangerous evolution of heat;

(d) Appropriate measures shall be taken to minimize the effects of vibration and shocks and prevent movement of the battery within the package that may lead to damage and a dangerous condition during carriage. When cushioning material is used to meet this requirement it shall be non-combustible and electrically non-conductive; and

(e) Non-combustibility shall be assessed according to a standard recognized in the country where the large packaging is designed or manufactured.

(2) For a single item of equipment containing cells or batteries:

Rigid large packagings conforming to the packing group II performance level, made of:

Steel (50A);

Aluminium (50B);

Metal other than steel or aluminium (50N);

Rigid plastics (50H);

Natural wood (50C);

Plywood (50D);

Reconstituted wood (50F);

Rigid fibreboard (50G).

Large packagings shall also meet the following requirements:

(a) A single item of equipment of different size, shape or mass may be packed in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the gross mass for which the design type has been tested;

(b) The equipment shall be constructed or packed in such a manner as to prevent accidental operation during carriage;

(c) Appropriate measures shall 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 carriage. When cushioning material is used to meet this requirement, it shall be non-combustible and electrically non-conductive; and

(d) Non-combustibility shall be assessed according to a standard recognized in the country where the large packaging is designed or manufactured.

Additional requirement:

Cells and batteries shall be protected against short circuit.

4.1.4.3 Add the following new packing instruction LP906:

LP906	**PACKING INSTRUCTION**	**LP906**

This instruction applies to damaged or defective batteries of UN Nos. 3090, 3091, 3480 and 3481 liable to rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of carriage.

The following large packagings are authorized, provided that the general provisions of **4.1.1** and **4.1.3** are met:

For a single battery and for a single item of equipment containing batteries :

Rigid large packagings conforming to the packing group I performance level, made of:

steel (50A);

aluminium (50B);

metal other than steel or aluminium (50N);

rigid plastics (50H);

plywood (50D);

rigid fibreboard (50G)

(1) The large packaging shall be capable of meeting the following additional performance requirements in case of rapid disassembly, dangerous reaction, production of a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours of the battery:

(a) The outside surface temperature of the completed package shall not have a temperature of more than 100 °C. A momentary spike in temperature up to 200 °C is acceptable;

(b) No flame shall occur outside the package;

(c) No projectiles shall exit the package;

(d) The structural integrity of the package shall be maintained; and

(e) The large packagings shall have a gas management system (e.g. filter system, air circulation, containment for gas, gas tight packaging etc.), as appropriate.

(2) The additional large packaging performance requirements shall be verified by a test as specified by the competent authority of any ADR Contracting Party who may also recognize a test specified by the competent authority of a country which is not an ADR Contracting Party provided that this test has been specified in accordance with the procedures applicable according to RID, ADR, ADN, the IMDG Code or the ICAO Technical Instructions [a].

A verification report shall be available on request. As a minimum requirement, the battery name, the battery number, the mass, type, energy content of the batteries, the large packaging identification and the test data according to the verification method as specified by the competent authority shall be listed in the verification report.

(3) When dry ice or liquid nitrogen is used as a coolant, the requirements of section 5.5.3 shall apply. The inner packaging and outer packaging shall 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.

Additional requirement:

Batteries shall be protected against short circuit.

[a] *The following criteria, as relevant, may be considered to assess the performance of the large packaging*:

(a) The assessment shall be done under a quality management system (as described e.g. in section 2.2.9.1.7 (e)) allowing for the traceability of tests results, reference data and characterization models used;

(b) The list of hazards expected in case of thermal run-away for the battery type, in the condition it is carried (e.g. usage of an inner packaging, state of charge (SOC), use of sufficient non-combustible, electrically non-conductive and absorbent cushioning material etc.), shall be clearly identified and quantified; the reference list of

LP906	PACKING INSTRUCTION	LP906

possible hazards for lithium batteries (rapidly disassemble, dangerously react, produce a flame or a dangerous evolution of heat or a dangerous emission of toxic, corrosive or flammable gases or vapours) can be used for this purpose. The quantification of these hazards shall rely on available scientific literature;

(c) The mitigating effects of the large packaging shall be identified and characterized, based on the nature of the protections provided and the construction material properties. A list of technical characteristics and drawings shall be used to support this assessment (Density [$kg \cdot m^{-3}$], specific heat capacity [$J \cdot kg^{-1} \cdot K^{-1}$], heating value [$kJ \cdot kg^{-1}$], thermal conductivity [$W \cdot m^{-1} \cdot K^{-1}$], melting temperature and flammability temperature [K], heat transfer coefficient of the outer packaging [$W \cdot m^{-2} \cdot K^{-1}$], ...);

(d) The test and any supporting calculations shall assess the result of a thermal run-away of the battery inside the large packaging in the normal conditions of carriage;

(e) In case the SOC of the battery is not known, the assessment used, shall be done with the highest possible SOC corresponding to the battery use conditions;

(f) The surrounding conditions in which the large packaging may be used and carried shall be described (including for possible consequences of gas or smoke emissions on the environment, such as ventilation or other methods) according to the gas management system of the large packaging;

(g) The tests or the model calculation shall consider the worst case scenario for the thermal run-away triggering and propagation inside the battery; this scenario includes the worst possible failure in the normal carriage condition, the maximum heat and flame emissions for the possible propagation of the reaction;

(h) These scenarios shall be assessed over a period of time long enough to allow all the possible consequences to occur (e.g. 24 hours).

4.1.5.12 The amendment does not apply to the English version.

4.1.6.4 In the second sentence, replace “risk” by “hazard”.

4.1.6.15 In the Table, in the column “Reference”, replace “ISO 11114-1: 2012” by: “EN ISO 11114-1: 2012 + A1:2017”.

4.1.6.15 In the Table, in the column “Reference”, replace “Annex A of ISO 10297:2006 or annex A of ISO 10297:2014” by: “Annex A of EN ISO 10297:2006 or annex A of EN ISO 10297:2014 or annex A of EN ISO 10297:2014 + A1:2017”.

4.1.6.15 In the table, for “4.1.6.8 Valves with inherent protection”, add the following new row:

4.1.6.8 Valves with inherent protection	EN ISO 17879:2017	Gas cylinders - Self-closing cylinder valves - Specification and type testing

4.1.9.1.5 Replace “risk” by “hazard” (twice).

4.1.10.4, MP 24 In the Table, insert a new column and a new row with the following heading: “0509”. At the intersections of this new column/row with the columns/rows for UN Nos. 0027, 0028, 0044, 0160 and 0161, insert: “B”.

Chapter 4.2

4.2.1.19.1 Replace “risk” by “hazard”.

4.2.5.2.6, portable tank instruction T23 In the first line after the title, at the end, add a new sentence to read as follows: “The formulations listed below may also be carried packed

in accordance with packing method OP8 of packing instruction P520 of 4.1.4.1, with the same control and emergency temperatures, if applicable.".

4.2.5.2.6, portable tank instruction T23, footnote (d) Replace risk" by "hazard".

4.2.5.3, portable tank special provision TP10 Add the following new sentence at the end: "A portable tank may be offered for carriage after the date of expiry of the last lining inspection for a period not to exceed three months beyond that date, after emptying but before cleaning, for purposes of performing the next required test or inspection prior to refilling.".

4.2.5.3, portable tank special provisions TP38 and TP39 Delete and add "*Deleted".*

Chapter 4.3

4.3.2.2.1 (a) Replace "risks" by "hazards".

4.3.3.5 Renumber the second paragraph, starting with "Tank-containers shall not be offered for carriage:" as 4.3.3.6.

4.3.4.1.3 Add the following new sentence at the end of the first paragraph: "The requirements for these tanks are given by the following tank codes supplemented by the relevant special provisions indicated in column (13) of table A in Chapter 3.2.".

Replace sub-paragraphs (a) to (i) by the following table:

Class	UN No.	Name and description	Tank code
1	0331	Explosive, blasting, Type B	S2.65AN
4.1	2448	Sulphur, molten	LGBV
	3531	Polymerizing substance, solid, stabilized, N.O.S.	SGAN
	3533	Polymerizing substance, solid, stabilized, temperature controlled, N.O.S	
	3532	Polymerizing substance, liquid, stabilized, N.O.S	L4BN
	3534	Polymerizing substance, liquid, stabilized, temperature controlled, N.O.S.	
4.2	1381	Phosphorus, white or yellow, dry, under water or in solution	L10DH
	2447	Phosphorus, white, molten	
4.3	1389	Alkali metal amalgam, liquid	L10BN
	1391	Alkali metal dispersion or Alkaline earth metal dispersion	
	1392	Alkaline earth metal amalgam, liquid	
	1415	Lithium	
	1420	Potassium metal alloys, liquid	
	1421	Alkali metal alloy, liquid, N.O.S.	
	1422	Potassium sodium alloys, liquid	
	1428	Sodium	
	2257	Potassium	
	3401	Alkali metal amalgam, solid	
	3402	Alkaline earth metal amalgam, solid	
	3403	Potassium metal alloys, solid	
	3404	Potassium sodium alloys, solid	
	3482	Alkali metal dispersion, flammable or Alkaline earth metal dispersion, flammable	
	1407	Caesium	L10CH
	1423	Rubidium	
	1402	Calcium carbide, packing group I	S2.65AN
5.1	1873	Perchloric acid with more than 50% but not more than 72% acid, by mass	L4DN
	2015	Hydrogen peroxide, aqueous solution, stabilized with more than 70% hydrogen peroxide	L4DV
	2014	Hydrogen peroxide, aqueous solution with not less than 20% but not more than 60% hydrogen peroxide	L4BV

Class	UN No.	Name and description	Tank code
	2015	Hydrogen peroxide, aqueous solution, stabilized with more than 60% hydrogen peroxide and not more than 70% hydrogen peroxide	
	2426	Ammonium nitrate, liquid, hot concentrated solution with more than 80% but not more than 93%	
	3149	Hydrogen peroxide and peroxyacetic acid mixture, stabilized	
	3375	Ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives, liquid	LGAV
	3375	Ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives, solid	SGAV
5.2	3109	Organic peroxide, type F, liquid	L4BN
	3119	Organic peroxide, type F, liquid, temperature controlled	
	3110	Organic peroxide, type F, Solid	S4AN
	3120	Organic peroxide, type F, solid, temperature controlled	
6.1	1613	Hydrogen cyanide, aqueous solution	L15DH
	3294	Hydrogen cyanide solution in alcohol	
7 [a]		All substances	special tanks
		Minimum requirement for liquids	L2.65CN
		Minimum requirement for solids	S2.65AN
8	1052	Hydrogen fluoride, anhydrous	L21DH
	1744	Bromine or bromine solution	
	1790	Hydrofluoric acid, solution, with more than 85% hydrofluoric acid	
	1791	Hypochlorite solution	L4BV
	1908	Chlorite solution	

[a] *Notwithstanding the general requirements of this paragraph, tanks used for radioactive material may also be used for the carriage of other goods provided the requirements of 5.1.3.2 are complied with.*".

4.3.5 Add the following new special provisions:

"TU42 Tanks with a shell constructed of aluminium alloy, including those with a protective lining, shall only be used if the pH value of the substance is not less than 5.0 and not more than 8.0.".

"TU43 An empty uncleaned tank may be offered for carriage after the date of expiry of the last inspection of the lining for a period not to exceed three months beyond this date for the purposes of performing the next inspection of the lining prior to refilling (see special provision TT2 in 6.8.4 (d)).".

Chapter 5.2

5.2.1 After the heading, renumber the Note as Note 1 and add a new Note 2:

*"**NOTE 2:** In accordance with the GHS, a GHS pictogram not required by ADR should only appear in carriage as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).".*

5.2.1.3 After "Salvage packagings" add "including large salvage packagings".

5.2.1.10.1 In the second indent, at the end, delete "and". In the third indent, at the end, replace the comma by "; and". Add the following new fourth indent:

"- machinery or apparatus containing liquid dangerous goods when it is required to ensure the liquid dangerous goods remain in their intended orientation (see special provision 301 of Chapter 3.3),".

Add the following new sub-section 5.2.2.1.12:

"5.2.2.1.12 *Special provisions for the labelling of articles containing dangerous goods carried as UN Nos. 3537, 3538, 3539, 3540, 3541, 3542, 3543, 3544, 3545, 3546, 3547 and 3548*

5.2.2.1.12.1 Packages containing articles or articles carried unpackaged shall bear labels according to 5.2.2.1 reflecting the hazards established according to 2.1.5, except that for articles that in addition contain lithium batteries, a lithium battery mark or a label conforming to model No. 9A is not required.

5.2.2.1.12.2 When it is required to ensure articles containing liquid dangerous goods remain in their intended orientation, orientation arrows meeting 5.2.1.10.1 shall 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.".

5.2.2.2.1.1.2 Replace the second and third sentences by "The minimum dimensions shall be 100 mm x 100 mm. There shall be a line inside the edge forming the diamond which shall be parallel and approximately 5 mm from the outside of that line to the edge of the label.".

5.2.2.2.1.1.3 In the first sentence, after "the dimensions may be reduced" add "proportionally". Delete the second and third sentences ("The line inside the edge shall remain 5 mm to the edge of the label. The minimum width of the line inside the edge shall remain 2 mm.").

5.2.2.2.1.2 The amendment to the first paragraph does not apply to the English version. In the paragraph after the Note, replace "risk" by "hazard".

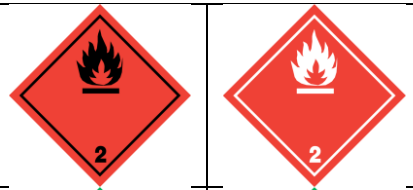
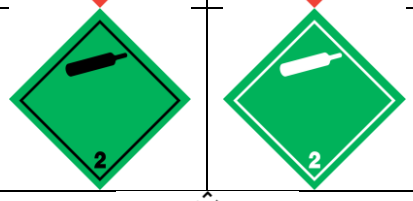
5.2.2.2.1.3 The amendment does not apply to the English version.

5.2.2.2.1.5 Replace "risk" by "hazard".

5.2.2.2.2 Amend to read as follows:

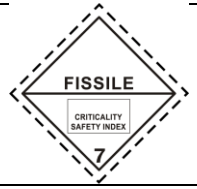
"5.2.2.2.2 Specimen labels

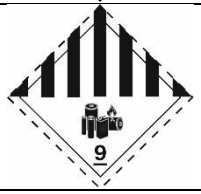
Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 1 hazard: Explosive substances or articles						
1	Divisions 1.1, 1.2, 1.3	Exploding bomb: black	Orange	1 (black)		-** Place for division – to be left blank if explosive is the subsidiary hazard -* Place for compatibility group – to be left blank if explosive is the subsidiary hazard
1.4	Division 1.4	1.4: black Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm)	Orange	1 (black)		* Place for compatibility group
1.5	Division 1.5	1.5: black Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm)	Orange	1 (black)		* Place for compatibility group
1.6	Division 1.6	1.6: black Numerals shall be about 30 mm in height and be about 5 mm thick (for a label measuring 100 mm × 100 mm)	Orange	1 (black)		* Place for compatibility group

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 2 hazard: Gases						
2.1	Flammable gases (except as provided for in 5.2.2.2.1.6 d))	Flame: black or white	Red	2 (black or white)		-
2.2	Non-flammable, non-toxic gases	Gas cylinder: black or white	Green	2 (black or white)		-
2.3	Toxic gases	Skull and crossbones: black	White	2 (black)		-

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 3 hazard: Flammable liquids						
3	-	Flame: black or white	Red	3 (black or white)	 	-
Class 4.1 hazard: Flammable solids, self-reactive substances, solid desensitized explosives and polymerizing substances						
4.1	-	Flame: black	White with 7 vertical red stripes	4 (black)		-
Class 4.2 hazard: Substances liable to spontaneous combustion						
4.2	-	Flame: black	Upper half white, lower half red	4 (black)		-
Class 4.3 hazard: Substances which, in contact with water emit flammable gases						
4.3	-	Flame: black or white	Blue	4 (black or white)	 	-

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 5.1 hazard: Oxidizing substances						
5.1	-	Flame over circle: black	Yellow	5.1 (black)		-
Class 5.2 hazard: Organic peroxides						
5.2	-	Flame: black or white	Upper half red, lower half yellow	5.2 (black)	 	-
Class 6.1 hazard: Toxic substances						
6.1	-	Skull and crossbones: black	White	6 (black)		-
Class 6.2 hazard: Infectious substances						
6.2	-	Three crescents superimposed on a circle: black	White	6 (black)		The lower half of the label may bear the inscriptions: "INFECTIOUS SUBSTANCE" and "In the case of damage or leakage immediately notify Public Health Authority" in black colour

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 7 hazard: Radioactive material						
7A	Category I – WHITE	Trefoil: black	White	7 (black)		Text (mandatory), black in lower half of label: “RADIOACTIVE” “CONTENTS ...” “ACTIVITY ...” One red vertical bar shall follow the word: “RADIOACTIVE”
7B	Category II – YELLOW	Trefoil: black	Upper half yellow with white border, lower half white	7 (black)		Text (mandatory), black in lower half of label: “RADIOACTIVE” “CONTENTS ...” “ACTIVITY ...” In a black outlined box: “TRANSPORT INDEX”; Two red vertical bars shall follow the word: “RADIOACTIVE”
7C	Category III – YELLOW	Trefoil: black	Upper half yellow with white border, lower half white	7 (black)		Text (mandatory), black in lower half of label: “RADIOACTIVE” “CONTENTS ...” “ACTIVITY ...” In a black outlined box: “TRANSPORT INDEX”. Three red vertical bars shall follow the word: “RADIOACTIVE”
7E	Fissile material	-	White	7 (black)		Text (mandatory): black in upper half of label: “FISSILE”; In a black outlined box in the lower half of label: “CRITICALITY SAFETY INDEX”

Label model No.	Division or Category	Symbol and symbol colour	Background	Figure in bottom corner (and figure colour)	Specimen labels	Note
Class 8 hazard: Corrosive substances						
8	-	Liquids, spilling from two glass vessels and attacking a hand and a metal: black	Upper half white, lower half black with white border	8 (white)		-
Class 9 hazard: Miscellaneous dangerous substances and articles, including environmentally hazardous substances						
9	-	7 vertical stripes in upper half: black	White	9 underlined (black)		-
9A	-	7 vertical stripes in upper half: black; battery group, one broken and emitting flame in lower half: black	White	9 underlined (black)		-

”.

Chapter 5.3

In the title of Chapter 5.3, after "CONTAINERS", insert ", BULK CONTAINERS".

5.3 After the heading, renumber the Note as Note 1 and after "containers," insert "bulk containers,". Add the following new Note 2:

*"**NOTE 2:** In accordance with the GHS, a GHS pictogram not required by ADR should only appear in carriage as part of a complete GHS label and not independently (see GHS 1.4.10.4.4).".*

5.3.1.1.1 In the first sentence, after "containers", insert ", bulk containers". In the second sentence, after "container", insert ", bulk container".

5.3.1.1.1 At the end, add: "The placards shall be weather-resistant and shall ensure durable marking throughout the entire journey.".

5.3.1.1.3 In the first paragraph, replace "risk" by "hazard".

5.3.1.1.5 Replace "risk" by "hazard" (twice).

5.3.1.2 In the title, after "containers", insert ", bulk containers". In the paragraph after the Note, at the end, add "and to two opposites sides of the bulk container".

5.3.1.3 In the title, after "containers", insert ", bulk containers". In the paragraph after the Note, after "containers", insert ", bulk containers".

5.3.2.1.4 Replace "transport units" by "vehicles" and "transport unit" by "vehicle" wherever it appears.

5.3.2.1.4 In the first sentence, replace "and containers" by ", containers and bulk containers" and replace "or container" by ", container or bulk container". In the second sentence, replace "or in the container" (first occurrence) by ", in the container or in the bulk container".

5.3.2.1.5 After "containers", insert ", bulk containers".

5.3.2.3.2 For hazard identification number 20, replace "risk" by "hazard".

5.3.3 Add the following sentence at the end of the second paragraph: "The mark shall be weather-resistant and shall ensure durable marking throughout the entire journey.".

5.3.6.1 and 5.3.6.2 After "containers", insert ", bulk containers".

5.3.6.1 Add the following new sentence at the end: "This does not apply to the exceptions listed in 5.2.1.8.1".

Chapter 5.4

5.4.1.1.1 (c) In the Note, replace "risk" by "hazard".

5.4.1.1.1 (d) In the Note, replace "risk" by "hazard".

5.4.1.1.1 (f) Amend Note 1 to read as follows:

*"**NOTE 1:** In the case of intended application of 1.1.3.6, the total quantity and the calculated value of dangerous goods for each transport category shall be indicated in the transport document in accordance with 1.1.3.6.3 and 1.1.3.6.4.".*

5.4.1.1.5 In the heading and the following sentence, after "salvage packagings" add "including large salvage packagings".

5.4.1.1.6.2.1 (b) In the first paragraph replace “risk(s)” by “hazard(s)”. In the second paragraph, replace “risk” by “hazard”.

5.4.1.1.15 Replace “2.2.41.1.17” by “7.1.7”.

5.4.1.1.19 In the first paragraph replace “risk(s)” by “hazard(s)”. In the second paragraph, replace “risk” by “hazard”.

5.4.1.2.3.1 Replace “2.2.52.1.15 to 2.2.52.1.17” by “2.2.52.1.15”.

5.4.1.2.5.1 (b) In the last sentence, replace “risk” by “hazard”.

Chapter 6.1

6.1.1.1 (b) Replace “(see Chapter 6.3, Note and packing instruction P621 of 4.1.4.1)” by “(see Note under the heading of Chapter 6.3 and packing instruction P621 of 4.1.4.1)”.

6.1.3, Note 3 The amendment does not apply to the English version.

6.1.5.8.1 Under item 8, add the following sentence at the end: “For plastics packagings subject to the internal pressure test in 6.1.5.5, the temperature of the water used.”.

Chapter 6.2

6.2.1.6.1 Replace the existing Note 2 with the following:

“***NOTE 2:*** *For seamless steel cylinders and tubes the check of 6.2.1.6.1 (b) and hydraulic pressure test of 6.2.1.6.1 (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.”.*

6.2.1.6.1 In Note 3, replace “The hydraulic pressure test may be replaced*”* by “The check of 6.2.1.6.1 (b) and the hydraulic pressure test of 6.2.1.6.1 (d) may be replaced”.

6.2.2.1.1 In the table, for “ISO 11118:1999”, in the column “Applicable for manufacture”, replace “Until further notice” by “Until 31 December 2020”.

6.2.2.1.1 In the table, after “ISO 11118:1999”, insert a new line to read as follows:

ISO 11118:2015	Gas cylinders – Non-refillable metallic gas cylinders – Specification and test methods	Until further notice

6.2.2.1.2 In the table, for “ISO 11120:1999”, in the column “Applicable for manufacture”, replace “Until further notice” by “Until 31 December 2022”.

6.2.2.1.2 In the table, after “ISO 11120:1999”, insert a new line to read as follows:

ISO 11120:2015	Gas cylinders – Refillable seamless steel tubes of water capacity between 150 *l* and 3 000 *l* – Design, construction and testing	Until further notice

6.2.2.1 Insert a new paragraph 6.2.2.1.8 to read as follows.

“6.2.2.1.8 The following standards apply for the design, construction and initial inspection and test of UN pressure drums, except that inspection requirements related to the conformity assessment system and approval shall be in accordance with 6.2.2.5:

Reference	Title	Applicable for Manufacture
ISO 21172-1:2015	Gas cylinders – Welded steel pressure drums up to 3 000 litres capacity for the transport of gases – Design and construction – Part 1: Capacities up to 1 000 litres ***NOTE:*** *Irrespective of section 6.3.3.4 of this standard, welded steel gas pressure drums with dished ends convex to pressure may be used for the carriage of corrosive substances provided all applicable requirements of ADR are met.*	Until further notice
ISO 4706:2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below	Until further notice
ISO 18172-1:2007	Gas cylinders – Refillable welded stainless steel cylinders – Part 1: Test pressure 6 MPa and below	Until further notice

”.

6.2.2.3 In the first table, for “ISO 13340:2001”, in the column “Applicable for manufacture”, replace “Until further notice” by “Until 31 December 2020”.

6.2.2.3 In the first table, insert the following rows at the end:

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

6.2.2.4 Amend the end of the introductory sentence to read: “…testing of UN cylinders and their closures:”.

Move the last row of the table into a new table, after the existing one, with the same headings and a new introductory sentence to read: “The following standard applies to the periodic inspection and testing of UN metal hydride storage systems:”.

6.2.2.4 In the first table, for “ISO 11623:2002”, in column “Applicable”, replace “Until further notice” by “Until 31 December 2020”. After the row for “ISO 11623:2002” insert the following new row:

ISO 11623:2015	Gas cylinders – Composite construction – Periodic inspection and testing	Until further notice

6.2.2.4 At the end of the first table, insert the following row:

ISO 22434:2006	Transportable gas cylinders – Inspection and maintenance of cylinder valves ***NOTE:*** *These requirements may be met at times other than at the periodic inspection and test of UN cylinders*	Until further notice

6.2.2.7.4 Under subparagraph (m), insert a new Note to read as follows:

“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.”.*

Add a new 6.2.3.5.3 to read as follows:

“6.2.3.5.3 *General provisions for the substitution of dedicated check(s) for periodic inspection and test required in 6.2.3.5.1*

6.2.3.5.3.1 This paragraph only applies to types of pressure receptacles designed and manufactured in accordance with the standards referred to in 6.2.4.1 or a technical code in accordance with 6.2.5, and for which the inherent properties of the design prevent the checks (b) or (d) for periodic inspection and test required in 6.2.1.6.1 to be applied or the results to be interpreted.

For such pressure receptacles, these check(s) shall be replaced by alternative method(s) related to the characteristics of the specific design specified under 6.2.3.5.4, and detailed in a special provision of Chapter 3.3 or a standard referenced in 6.2.4.2.

The alternative methods shall specify which checks and tests according to 6.2.1.6.1 (b) and (d) are to be substituted.

The alternative method(s) in combination with the remaining checks according to 6.2.1.6.1 (a) to (e) shall ensure a level of safety at least equivalent to the safety level for pressure receptacles of a similar size and use which are periodically inspected and tested in compliance with 6.2.3.5.1.

The alternative method(s) shall moreover detail all the following elements:

- A description of the relevant types of pressure receptacles;
- The procedure for the test(s);
- The specifications of the acceptance criteria;
- A description of the measures to be taken in case of rejection of pressure receptacles.

6.2.3.5.3.2 Non-destructive testing as an alternative method

The check(s) identified in 6.2.3.5.3.1 shall be supplemented or replaced by one (or more) non-destructive test method(s) to be performed on each individual pressure receptacle.

6.2.3.5.3.3 Destructive testing as an alternative method

If no non-destructive test method leads to an equivalent level of safety, the check(s) identified in 6.2.3.5.3.1, with exception of the check of the internal conditions mentioned in 6.2.1.6.1 b, shall be supplemented or replaced by one (or more) destructive test method(s) in combination with its statistical evaluation.

In addition to the elements described above, the detailed method for destructive testing shall document the following elements:

- A description of the relevant basic population of pressure receptacles;
- A procedure for the random sampling of individual pressure receptacles to be tested;
- A procedure for the statistical evaluation of the test results including rejection criteria;
- A specification for the periodicity of destructive sample tests;
- A description of the measures to be taken if acceptance criteria are met but a safety relevant degradation of material properties is observed, which shall be used for the determination of the end of service life;
- A statistical assessment of the level of safety achieved by the alternative method.".

Add the following new 6.2.3.5.4:

"6.2.3.5.4 Over-moulded cylinders subject to 6.2.3.5.3.1 shall be subject to periodic inspection and test in accordance with special provision 674 of Chapter 3.3.".

6.2.3.6.1 Amend the first paragraph after the table to read as follows:

"For refillable pressure receptacles, the conformity assessment of valves and other demountable accessories having a direct safety function may be carried out separately from the pressure receptacles. For non-refillable pressure receptacles, the conformity assessment of valves and other demountable accessories having a direct safety function shall be carried out together with the assessment of the pressure receptacles.".

6.2.3.9.6 Add "or pressure drum" after "cylinder" twice.

6.2.4.1 In the table, under "for design and construction", for standard "EN ISO 11120:1999 + A1:2013", in column (4), replace "Until further notice" by "Between 1 January 2015 and 31 December 2020". After standard "EN ISO 11120:1999 + A1:2013", insert the following new row:

EN ISO 11120:2015	Gas cylinders - Refillable seamless steel tubes of water capacity between 150 *l* and 3000 *l* - Design, construction and testing	6.2.3.1 and 6.2.3.4	Until further notice

6.2.4.1 Amend the Table, under "for design and construction", as follows:

– Amend the Note appearing under the title of standard EN 1251-2:2000 to read as follows:

"***NOTE:*** *Standards EN 1252-1:1998 and EN 1626 referenced in this standard are also applicable to closed cryogenic receptacles for the carriage of UN No. 1972 (METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID).*".

6.2.4.1 In the table, under "for design and construction", for "EN 14140:2014 + AC:2015", in column (1), delete "(except over-moulded cylinders)".

6.2.4.1 Amend the Table, under "for closures", as follows:

– For standard "EN ISO 10297:2014", in column (2), delete: "(ISO/DIS 10297:2012)".

– For standard "EN ISO 10297:2014", in column (4), replace "Until further notice" by: "Between 1 January 2015 and 31 December 2020".

– After standard "EN ISO 10297:2014", insert the following new row:

EN ISO 10297:2014 + A1:2017	Gas cylinders – Cylinder valves – Specification and type testing	6.2.3.1 and 6.2.3.3	Until further notice

– Under the title of standard EN 1626:2008, insert the following Note:

"***NOTE:*** *This standard is also applicable to valves for the carriage of UN No 1972 (METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID).*"

6.2.4.1 In the table, under "for closures", for standard "EN ISO 17871:2015", in column (4), replace "Until further notice" by " Between 1 January 2017 and 31 December 2020". After standard "EN ISO 17871:2015", add the following new standard:

EN ISO 17871:2015 + A1:2018	Gas cylinders - Quick-release cylinder valves - Specification and type testing	6.2.3.1, 6.2.3.3 and 6.2.3.4	Until further notice	

6.2.4.1 In the table, under "for closure", add the following new row:

EN ISO 17879:2017	Gas cylinders - Self-closing cylinder valves - Specification and type testing	6.2.3.1 and 6.2.3.4	Until further notice	

6.2.4.2 In the table, delete the rows for “EN ISO 11623:2002 (except article 4”, “EN 14912:2005” and “EN 1440:2008 + A1:2012 (except annexes G and H)”. For standard “EN 1440:2016 (except annex c)”, in column 3), replace “Mandatorily from 1 January 2019” by “Until 31 December 2020”. After standard “EN 1440:2016 (except annex C)”, add the following new standard:

EN 1440:2016 + A1:2018 (except Annex C)	LPG equipment and accessories -– Transportable refillable traditional welded and brazed steel Liquefied Petroleum Gas (LPG) cylinders -– Periodic inspection	Mandatorily from 1 January 2021

6.2.4.2 For standard “EN 16728:2016 (except clause 3.5, Annex F and Annex G)”, in column (3), replace “Mandatorily from 1 January 2019” by “Until 31 December 2020”. After standard “EN 16728:2016 (except clause 3.5, Annex F and Annex G)” add the following new row:

EN 16728:2016 +A1:2018	LPG equipment and accessories - Transportable refillable LPG cylinders other than traditional welded and brazed steel cylinders - Periodic inspection	Mandatorily from 1 January 2021

6.2.6.4 At the end of the third indent, delete “, excluding clause 9” and add the following new sentence: “In addition to the marks required by this standard the gas cartridge shall be marked “UN 2037/EN 16509”.”.

Chapter 6.5

6.5.6.9.3 Amend the last paragraph to read as follows:

“The same IBC or a different IBC of the same design may be used for each drop.”

6.5.6.14.1 Under item 8, add the following sentence: “For rigid plastics and composite IBCs subject to the hydraulic pressure test in 6.5.6.8, the temperature of the water used.”.

Chapter 6.7

6.7.2.2.16 The amendment does not apply to the English version.

Chapter 6.8

6.8.2.1.9 In the first paragraph, replace “substantially” by “appreciably”

6.8.2.1.23 In the first sentence of the first paragraph, after “The ability of the manufacturer” add “, or the maintenance or repair shop,*”* and at the end, delete *“*, which issues the type approval”. In the second sentence of the first paragraph, at the end, add “or the maintenance or repair shop”.

6.8.2.1.23 In the last sentence of the first paragraph after “ultrasound”, insert a reference to a footnote [6] to read as follows:

“[6] Lap joints used for joining an end to the shell wall may be tested using alternative methods to radiography or ultrasound.”.

In Chapter 6.8, renumber footnotes 6 to 16 as footnotes 7 to 17.

6.8.2.1.23 Amend the second sentence under “$\lambda = 0.8$” to read as follows:

“The non-destructive checks shall include all weld “Tee” junctions, all inserts used to avoid welds crossing and all welds in the knuckle area of the tank ends.”.

6.8.2.1.23 Amend the second sentence under "λ = 0.9" to read as follows:

"The non-destructive checks shall include all connections, all inserts used to avoid welds crossing, all welds in the knuckle area of the tank ends and all welds for the assembly of large-diameter items of equipment.".

6.8.2.2.2 After the second set of indents, replace the wording "an ebonite or thermoplastic coating" by "a protective lining".

6.8.2.2.3 Add the following new paragraph at the end:

"Flame arresters for breather devices shall be suitable for the vapour emitted by the substances carried (maximum experimental safety gap – MESG), temperature range and application. They shall meet the requirements and tests of EN ISO 16852:2016 *(Flame arresters - Performance requirements, test methods and limits for use)* for the situations given in the table below:

Application/Installation	Testing requirements
Direct communication with atmosphere	EN ISO 16852:2016, 7.3.2.1
Communication to pipe work system	EN ISO 16852:2016, 7.3.3.2 (applies to valve/flame arrester combinations when tested together)
	EN ISO 16852:2016, 7.3.3.3 (applies to flame arresters tested independently of the valves)

".

6.8.2.2.10 Amend the first sentence of the second sub-paragraph to read as follows:

"The bursting disc shall rupture at a nominal pressure between 0.9 to 1.0 times the test pressure, except for tanks intended for the carriage of compressed, liquefied or dissolved gases where the arrangement of the bursting disc and safety valve shall be such as to satisfy the competent authority.".

At the end of the second sub-paragraph, delete: "which may disrupt the action of the safety valve".

6.8.2.2.11 Add the following new paragraph: "Glass level-gauges and level-gauges made of other fragile material, which are in direct communication with the contents of the shell, shall not be used.".

6.8.2.3.1 Amend the second indent to read as follows (the dividing line is deleted):

"– an approval number for the type which shall consist of the distinguishing sign used on vehicles in international road traffic[9] of the State in whose territory the approval was granted and a registration number;".

6.8.2.4.2 and 6.8.2.4.3 Add the following new paragraph at the end:

"Protective linings shall be visually examined for defects. In case defects appear the condition of the lining shall be evaluated by appropriate test(s).".

6.8.2.6.1 Amend the Table, under "For design and construction of tanks", as follows:

– Amend the Note appearing under the title of standard EN 13530-2:2002 + A1:2004 as follows:

*"**NOTE:** Standards EN 1252-1:1998 and EN 1626 referenced in this standard are also applicable to closed cryogenic receptacles for the carriage of UN No. 1972 (METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID)."*

6.8.2.6.1 Amend the Table, under "For equipment", as follows:

– Under the title of standard EN 1626:2008, insert the following Note:

*"**NOTE**: This standard is also applicable to valves for the carriage of UN No 1972 (METHANE, REFRIGERATED LIQUID or NATURAL GAS, REFRIGERATED LIQUID)."*

6.8.2.6.1 In the table, under "For equipment", for standard "EN 13317:2002 + A1:2006", in column (4), replace "Until further notice" by "Between 1 January 2009 and 31 December 2020". After standard "EN 13317: 2002 + A1:2006", add the following new standard:

EN 13317:2018	Tanks for transport of dangerous goods - Service equipment for tanks - Manhole cover assembly	6.8.2.2 and 6.8.2.4.1	Until further notice	

6.8.2.6.1 Amend the table, under "For equipment", as follows:

– For standard "EN 14595:2005", in column (4), replace "Until further notice" by "Between 1 January 2007 and 31 December 2020".

– After standard "EN 14595:2005", insert the following new row:

EN 14595:2016	Tanks for transport of dangerous goods – Service equipment – Breather device	6.8.2.2 and 6.8.2.4.1	Until further notice	

6.8.3.2.6 Delete the first sentence

6.8.3.2.9 At the end, add the following new sub-paragraph:

"Safety valves shall be designed to prevent or be protected from the entry of water or other foreign matter which may impair their correct functioning. Any protection shall not impair their performance.".".

6.8.3.2.21 At the end, delete "The basic requirements of this paragraph shall be deemed to have been complied with if the following standards are applied: *(Reserved).*".

6.8.3.6 In the table, for standard "EN 13807:2003", in column (4), replace "Until further notice" by "Between 1 January 2005 and 31 December 2020". After standard "EN 13807:2003", add the following new standard:

EN 13807:2017	Transportable gas cylinders - Battery vehicles and multiple-element gas containers (MEGCs) - Design, manufacture, identification and testing	6.8.3.1.4, 6.8.3.1.5, 6.8.3.2.18 to 6.8.3.2.28, 6.8.3.4.12 to 6.8.3.4.14 and 6.8.3.5.10 to 6.8.3.5.13	Until further notice	

6.8.4 (d), special provision TT2 At the end, add "(see special provision TU43 in 4.3.5)".

6.8.5.1.2 (a) At the end, add the following new indent:

"– Austenitic-ferritic stainless steels, down to a temperature of -40 °C;".

6.8.5.2.1 At the end of the second indent, replace "or austenitic Cr - Ni steel", by "austenitic Cr - Ni steel; or austenitic-ferritic stainless steel".

6.8.5.4 Replace "EN 1252-1:1998 Cryogenic vessels - Materials - Part 1: Toughness requirements for temperatures below -80°C" by "EN ISO 21028-1:2016 Cryogenic vessels - Toughness requirements for materials at cryogenic temperature - Part 1: Temperatures below -80 °C".

Chapter 6.9

6.9.3.1 Replace “and 6.8.2.2.4” by “, 6.8.2.2.4 and 6.8.2.2.6”.

Chapter 6.10

6.10.1.2.1 In the third paragraph, in the first sentence, replace “with the exception of requirements overtaken by a special provision in this Chapter” by “except where overtaken by special requirements in this Chapter.”.

6.10.3.8 (f) In the second sentence, replace “Sight glasses” by “Glass level-gauges and level-gauges of other suitable transparent material”.

Chapter 7.1

Amend the heading to read “GENERAL PROVISIONS AND SPECIAL PROVISIONS FOR TEMPERATURE CONTROL”.

Add the following new 7.1.7:

“**7.1.7 Special provisions applicable to the carriage of self-reactive substances of Class 4.1, organic peroxides of Class 5.2 and substances stabilized by temperature control (other than self-reactive substances and organic peroxides)**

7.1.7.1 All self-reactive substances, organic peroxides and polymerizing substances shall be protected from direct sunlight and all sources of heat, and placed in adequately ventilated areas.

7.1.7.2 Where a number of packages are assembled in a container or closed vehicle, the total quantity of substance, the type and number of packages and the stacking arrangement shall not create an explosion hazard.

7.1.7.3 *Temperature control provisions*

7.1.7.3.1 These provisions apply to certain self-reactive substances when required by 2.2.41.1.17, and certain organic peroxides when required by 2.2.52.1.15 and certain polymerizing substances when required by 2.2.41.1.21 or special provision 386 of Chapter 3.3 which may only be carried under conditions where the temperature is controlled.

7.1.7.3.2 These provisions also apply to the carriage of substances for which:

(a) The proper shipping name as indicated in column 2 of Table A of Chapter 3.2 or according to 3.1.2.6 contains the word “STABILIZED”; and

(b) The SADT or SAPT determined for the substance (with or without chemical stabilization) as offered for carriage is:

(i) 50 °C or less for single packagings and IBCs; or

(ii) 45 °C or less for tanks.

When chemical inhibition is not used to stabilize a reactive substance which may generate dangerous amounts of heat and gas, or vapour, under normal carriage conditions, this substance needs to be carried under temperature control. These provisions do not apply to substances which are stabilized by the addition of chemical inhibitors such that the SADT or the SAPT is greater than that prescribed in (b) (i) or (ii), above.

7.1.7.3.3 In addition, if a self-reactive substance or organic peroxide or a substance the proper shipping name of which contains the word “STABILIZED” and which is not

normally required to be carried under temperature control is carried under conditions where the temperature may exceed 55 °C, it may require temperature control.

7.1.7.3.4 The "control temperature" is the maximum temperature at which the substance can be safely carried. It is assumed that during carriage the temperature of the immediate surroundings of the package does not exceed 55 °C and attains this value for a relatively short time only during each period of 24 hours. In the event of loss of temperature control, it may be necessary to implement emergency procedures. The "emergency temperature" is the temperature at which such procedures shall be implemented.

7.1.7.3.5 Derivation of control and emergency temperatures

Type of receptacle	SADT[a] /SAPT[a]	Control temperature	Emergency temperature
Single packagings and IBCs	20 °C or less over 20 °C to 35 °C over 35 °C	20 °C below SADT/SAPT 15 °C below SADT/SAPT 10 °C below SADT/SAPT	10 °C below SADT/SAPT 10 °C below SADT/SAPT 5 °C below SADT/SAPT
Tanks	≤ 45 °C	10 °C below SADT/SAPT	5 °C below SADT/SAPT

[a] *i.e. the SADT/SAPT of the substance as packed for carriage.*

7.1.7.3.6 The control and emergency temperatures are derived using the table in 7.1.7.3.5 from the SADT or from the SAPT which are defined as the lowest temperatures at which self-accelerating decomposition or self-accelerating polymerization may occur with a substance in the packaging, IBC or tank as used in carriage. An SADT or SAPT shall be determined in order to decide if a substance shall be subjected to temperature control during carriage. Provisions for the determination of the SADT and SAPT are given in Part II, section 28 of the Manual of Tests and Criteria.

7.1.7.3.7 Control and emergency temperatures, where appropriate, are provided for currently assigned self-reactive substances in 2.2.41.4 and for currently assigned organic peroxide formulations in 2.2.52.4.

7.1.7.3.8 The actual carriage temperature may be lower than the control temperature but shall be selected so as to avoid dangerous separation of phases.

7.1.7.4 *Carriage under temperature control*

7.1.7.4.1 Maintenance of the prescribed temperature is an essential feature of the safe carriage of substances stabilized by temperature control. In general, there shall be:

(a) Thorough inspection of the cargo transport unit prior to loading;

(b) Instructions to the carrier about the operation of the refrigeration system including a list of the suppliers of coolant available en route;

(c) Procedures to be followed in the event of loss of control;

(d) Regular monitoring of operating temperatures; and

(e) Provision of a back-up refrigeration system or spare parts.

7.1.7.4.2 Any control and temperature sensing devices in the refrigeration system shall be readily accessible and all electrical connections weather-proof. The temperature of air space within the cargo transport unit shall be measured by two independent sensors and the output shall be recorded so that temperature changes are readily detectable. The temperature shall be checked every four to six hours and logged. When substances having a control temperature of less than +25 °C are carried, the cargo transport unit shall be equipped with visible and audible alarms, powered independently of the refrigeration system, set to operate at or below the control temperature.

7.1.7.4.3 If during carriage the control temperature is exceeded, an alert procedure shall be initiated involving any necessary repairs to the refrigeration equipment or an increase in the cooling capacity (e.g. by adding liquid or solid refrigerants). The temperature shall also be checked frequently and preparations made for implementation of the emergency procedures. If the emergency temperature is reached, the emergency procedures shall be initiated.

7.1.7.4.4 The suitability of a particular means of temperature control for carriage depends on a number of factors. Factors to be considered include:

(a) The control temperature(s) of the substance(s) to be carried;

(b) The difference between the control temperature and the anticipated ambient temperature conditions;

(c) The effectiveness of the thermal insulation;

(d) The duration of carriage; and

(e) Allowance of a safety margin for delays.

7.1.7.4.5 Suitable methods for preventing the control temperature being exceeded are, in order of increasing control capability:

(a) Thermal insulation provided that the initial temperature of the substance(s) to be carried is sufficiently below the control temperature;

(b) Thermal insulation with coolant system provided that:

(i) An adequate quantity of non-flammable coolant (e.g. liquid nitrogen or solid carbon dioxide), allowing a reasonable margin for delay, is carried or a means of replenishment is assured;

(ii) Liquid oxygen or air is not used as coolant;

(iii) There is a uniform cooling effect even when most of the coolant has been consumed; and

(iv) The need to ventilate the transport unit before entering is clearly indicated by a warning on the door(s) of the transport unit;

(c) Thermal insulation and single mechanical refrigeration provided that for substance(s) to be carried with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings, EEx IIB T3 are used within the cooling compartment to prevent ignition of flammable vapours from the substances;

(d) Thermal insulation and combined mechanical refrigeration system with coolant system; provided that:

(i) The two systems are independent of one another;

(ii) The provisions in (b) and (c) are complied with;

(e) Thermal insulation and dual mechanical refrigeration system; provided that:

(i) Apart from the integral power supply unit, the two systems are independent of one another;

(ii) Each system alone is capable of maintaining adequate temperature control; and

(iii) For substance(s) to be carried with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings, EEx IIB T3, are used within the cooling compartment to prevent ignition of flammable vapours from the substances.

7.1.7.4.6 The methods described in 7.1.7.4.5 (d) and (e) may be used for all organic peroxides and self-reactive substances and polymerizing substances.

The method described in 7.1.7.4.5 (c) may be used for organic peroxides and self-reactive substances of Types C, D, E and F and, when the maximum ambient temperature to be expected during carriage does not exceed the control temperature by more than 10 °C, for organic peroxides and self-reactive substances of Type B and polymerizing substances.

The method described in 7.1.7.4.5 (b) may be used for organic peroxides and self-reactive substances of Types C, D, E and F and polymerizing substances when the maximum ambient temperature to be expected during carriage does not exceed the control temperature by more than 30 °C.

The method described in 7.1.7.4.5 (a) may be used for organic peroxides and self-reactive substances of Types C, D, E and F and polymerizing substances when the maximum ambient temperature to be expected during carriage is at least 10 °C below the control temperature.

7.1.7.4.7 Where substances are required to be carried in insulated, refrigerated or mechanically-refrigerated vehicles or containers, these vehicles or containers shall satisfy the requirements of Chapter 9.6.

7.1.7.4.8 If substances are contained in protective packagings filled with a coolant, they shall be loaded in closed or sheeted vehicles or closed or sheeted containers. If the vehicles or containers used are closed they shall be adequately ventilated. Sheeted vehicles and containers shall be fitted with sideboards and a tailboard. The sheets of these vehicles and containers shall be of an impermeable and non-combustible material.".

Chapter 7.2

7.2.4, V8 Amend to read as follows:

"V8 See 7.1.7.

NOTE: *This special provision V8 does not apply to substances referred to in 3.1.2.6 when substances are stabilized by the addition of chemical inhibitors such that the SADT is greater than 50 °C. In this case, temperature control may be required under conditions of carriage where the temperature may exceed 55 °C.*".

Chapter 7.3

7.3.2.10 Under the heading, insert the following Note:

"***NOTE:*** *Flexible bulk containers marked in accordance with 6.11.5.5 but which were approved in a country which is not a Contracting Party to ADR may nevertheless be used for carriage under ADR.*".

7.3.3.1 After the first paragraph, insert a Note to read as follows:

"***NOTE:*** *Where a VC1 code is shown in column (17) of Table A of Chapter 3.2, a BK1 bulk container may therefore also be used for land transport provided the additional provisions in 7.3.3.2 are fulfilled. Where a VC2 code is shown in column (17) of Table A of Chapter 3.2, a BK2 bulk container may therefore also be used for land transport provided the additional provisions in 7.3.3.2 are fulfilled.*".

Chapter 7.5

7.5.1.1 Replace "The vehicle and its driver" by "The vehicle and the vehicle crew".

7.5.1.2 Replace "shows that the vehicle, the driver" By "shows that the vehicle and the vehicle crew".

7.5.2.2 In table note b, replace "risk" by "hazard". The second modification does not apply to the English text.

7.5.7.1 Amend footnote 1 referenced to read as follows:

"[1] *Guidance on the stowage of dangerous goods can be found in the IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code) (see e.g., Chapter 9 Packing cargo into CTUs and Chapter 10 Additional advice on the packing of dangerous goods) and in the "European Best Practice Guidelines on Cargo Securing for Road Transport" published by the European Commission. Other guidance is also available from competent authorities and industry bodies.*".

7.5.7.4 Amend to read as follows:

"7.5.7.4 The provisions of 7.5.7.1 shall also apply to the loading, stowage and removal of containers, tank-containers, portable tanks and MEGCs on to and from vehicles. When tank-containers, portable tanks and MEGCs do not include, by construction, corner castings as defined in ISO 1496-1 *Series 1 freight containers – Specification and testing – Part 1: General cargo containers for general purposes*, it shall be verified that the systems used on the tank-containers, portable tanks or MEGCs are compatible with the system on the vehicle and in compliance with the requirements in 9.7.3.".

7.5.7.6.1 In the Note, after "referred to in 7.5.7.1", delete "and to the IMO/ILO/UNECE Code of Practice for Packing of Cargo Transport Units (CTU Code)".

7.5.11, special provision CV20 Replace "and special provisions V1 and V8 (5) and (6) of Chapter 7.2" by "and 7.1.7.4.7 and 7.1.7.4.8 as well as special provision V1 of Chapter 7.2".

7.5.11, special provision CV21 In the third paragraph, replace "in accordance with methods R2 or R4 of special provision V8 (3) of Chapter 7.2" by "in accordance with the methods described in 7.1.7.4.5 (b) or (d)".

7.5.11 The amendment to special provision CV36 does not apply to the English text.

Chapter 8.1

8.1.2.1 (a) Replace "the large container or vehicle packing certificate" by: "the container/vehicle packing certificate".

8.1.5.2 In the fourth indent, replace "EN 471:2003+ A1:2007 standard" by "EN ISO 20471 standard".

Chapter 8.2

The amendments do not apply to the English version.

Chapter 8.5

8.5, S4 Amend to read as follows:

"S4 See 7.1.7.

NOTE: *This special provision S4 does not apply to substances referred to in 3.1.2.6 when substances are stabilized by the addition of chemical inhibitors such that the SADT is greater than 50 °C. In this case, temperature control may be required under conditions of carriage where the temperature may exceed 55 °C.*".

8.5, S6 Replace "risk" by "hazard".

8.5, S12 In the first sentence, replace "risk" by "hazard".

Chapter 9.1

9.1.3.3 At the end, introduce the following new paragraph:

"The certificate for EX/III vehicles intended for the carriage of explosive substances in tanks in compliance with the requirements of 9.7.9 shall bear the following remark under No. 11: "Vehicle in compliance with 9.7.9 of ADR for the carriage of explosive substances in tanks".".

Chapter 9.2

9.2.2.2.1 In the second paragraph, at the end, delete "given in ISO 16750-4:2010 and ISO 16750-5:2010,".

9.2.2.9.1 (a) Replace "parts 1, 2, 5, 6, 7, 11, 15 or 18" by "parts 1, 2, 5, 6, 7, 11, 15, 18, 26 or 28".

Chapter 9.6

9.6.1 (a) Replace "2.2.52.1.16" by "2.2.52.1.15".

9.6.2 Amend the first sentence to read as follows: "Suitable methods to prevent the control temperature from being exceeded are listed in 7.1.7.4.5."

Chapter 9.7

9.7.3 Amend to read as follows:

"**9.7.3 Fastening**

9.7.3.1 Fastenings shall be designed to withstand static and dynamic stresses in normal conditions of carriage. Fastenings also include any supporting frames used for mounting the structural equipment (see definition in 1.2.1) to the vehicle.

9.7.3.2 Fastenings in the case of tank-vehicles, battery-vehicles and vehicles carrying tank-containers, demountable tanks, portable tanks, MEGCs or UN MEGCs shall be capable of absorbing, under the maximum permissible load, the following separately applied static forces:

- In the direction of travel: twice the total mass multiplied by the acceleration due to gravity (g)[1];

- Horizontally, at right angles to the direction of travel: the total mass multiplied by the acceleration due to gravity (g)[1];

- Vertically upwards: the total mass multiplied by the acceleration due to gravity (g)[1];

- Vertically downwards: twice the total mass multiplied by the acceleration due to gravity (g)[1].

NOTE: *The requirements of this paragraph do not apply to twist lock tie-down devices in compliance with ISO 1161:2016 "Series 1 freight containers -- Corner and intermediate fittings – Specifications". However, the requirements apply to any frames or other devices used for support of such fastenings on the vehicle.*".

Footnote 1 reads: "*For calculation purposes g = 9.81 m/s*^{2}.". Renumber existing footnote 1 in Chapter 9.7 as footnote 2.

9.7.3 Add the following new paragraph:

"9.7.3.3 For tank-vehicles, battery-vehicles and vehicles carrying demountable tanks, the fastenings shall withstand the minimum stresses as defined in 6.8.2.1.11 to 6.8.2.1.13, 6.8.2.1.15 and 6.8.2.1.16.".

9.7.8.2 Replace "parts 1, 2, 5, 6, 7, 11 or 18" by "parts 1, 2, 5, 6, 7, 11, 18, 26 or 28".