No. 8940. EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR). DONE AT GENEVA ON 30 SEPTEMBER 1957[1]

ENTRY INTO FORCE of amendments to annexes A and B of the above-mentioned Agreement

The amendments were proposed by the Government of France and circulated by the Secretary-General on 1 July 1973. They came into force on 1 January 1974, in accordance with the provisions of article 14 (3) of the Agreement.

[AUTHORITATIVE TRANSLATION—TRADUCTION OFFICIELLE]

ANNEX A

2000 (2) Beginning of second sentence should read:

"Provisions concerning receptacles are applicable to fixed tanks, batteries of receptacles, demountable tanks and tank-containers only if . . .".

ANNEX B

Contents (page iv) Insert after "APPENDICES":

"Provisions common to Appendices B.1 concerning tanks and B.1b concerning tank-containers 200 000-209 999

Appendix B.1 Provisions concerning fixed tanks (tank-vehicles), batteries of receptacles and demountable tanks. 210 000-211 049

Appendix B.1a Requirements and recommendations concerning the materials and construction of fixed tanks, batteries of receptacles and demountable tanks intended for the carriage of deeply-refrigerated liquefied gases of Class Id. 211 050-212 099

Appendix B.1b Provisions concerning tank-containers (design and testing) 212 100-219 999"

(The remainder unchanged).

10 000 (1) (c) Beginning of sub-paragraph (c) should read:

"(c) appendices as follows:

—Appendix B.1 concerning fixed tanks (tank-vehicles) batteries of receptacles and demountable tanks;

—Appendix B.1a concerning requirements and recommendations concerning the materials and construction of fixed tanks, batteries of receptacles and demountable tanks intended for the carriage of deeply-refrigerated liquefied gases of Class Id;

—Appendix B.1b concerning tank-containers."

(The remainder unchanged).

10 102 (1) Definition of "tank-container" should read:

—"the term "tank-container" means an article of transport equipment conforming to the definition of the term "container" given above and built to contain liquid, gaseous, powdery or granular substances but having a capacity of more than 0.45 cubic metres".

Definitions of "large tank-container" and of "small tank-container" should be deleted.

Definition of "large movable tank" should be deleted.

Definition of "tank" should read:

—"the term "tank", when used alone, means a fixed tank, a demountable tank, a tank-container or a battery of receptacles (see, how-

[1] United Nations, *Treaty Series*, vol. 619, p. 77; for subsequent actions, see references in Cumulative Indexes Nos. 9 and 11, as well as annex A in volumes 774, 779, 827, 828, 848, 883, 892 and 905.

ever, a limitation of the meaning of the word "tank" in marginal 200 000 (3) of the provisions common to Appendices B.1 and B.1b)."

10 102 (2) Beginning of second sentence should read:
"Provisions concerning receptacles are applicable to fixed tanks, batteries of receptacles, demountable tanks and tank-containers only if . . .".

10 118 NOTE, delete "small and large" before "tank-containers".

10 121 (2) At the beginning of first sentence, replace "in a large movable tank or a small tank-container" by "in a demountable tank, a battery of receptacles or a tank-container" and at the end of the sentence "of the large movable tank or small tank-container" by "of the demountable tank, battery of receptacles or tank-container".

10 127 (2) Replace this paragraph by the following text:
"(2) The provisions concerning the construction, items of equipment, type approval, tests, marking, etc. of tank-containers are to be found in appendix B.1b".
Add the following paragraphs:
"(3) The provisions common to appendices B.1 and B.1b are to be found in marginal 200 000.
"(4) For receptacles, see Annex A.".

14 104 Add to the text:
"For gases of 6° and 7° sheeting shall not be compulsory".

14 121 (1) Replace "large movable tanks" by "demountable tanks or batteries of receptacles".

(2) Replace this paragraph by the following text:
"(2) All substances of class Id, 1° to 14°, except fluorine (3°) and cyanogen chloride (8°(a)), may be carried in tank-containers. However, hydrogen fluoride (anhydrous hydrofluoric acid) (5°), chlorine (5°) and phosgene (carbonyl chloride) (8°(a)) shall not be carried in tank-containers of a cubic capacity exceeding 1 m^3.".

14 122-14 126 Amend this entry to read:
"14 122-
14 127"

14 127 Delete this marginal.

14 128 The beginning of the sentence which now becomes paragraph (1) should read:
"(1) To be accepted for carriage, empty fixed tanks, empty batteries of receptacles and empty demountable tanks (see Note 1 to marginal 2131, 18°, in Annex A) which have contained . . .".
Add a second paragraph:

15 121 "(2) For tank-containers, see marginal 212 707.".
The sentence which now becomes paragraph (1) should read:
"(1) Sodium, potassium and alloys of sodium and potassium (1°(a)) may be carried in fixed tanks and in demountable tanks.".
Add a second paragraph:
"(2) Sodium, potassium and alloys of sodium and potassium (1°(a)) and trichlorosilane (silicochloroform) (4°) of class Ie may be carried in tank-containers.".

15 122-15 126 Amend this entry to read:
"15 122-
15 127"

15 127 Delete this marginal.

15 128 The beginning of the sentence which now becomes paragraph (1) should read:
"(1) To be accepted for carriage, empty fixed tanks and empty demountable tanks which have contained . . .".

	Add a second paragraph: "(2) For tank-containers, see marginal 212 707.".
21 121	This marginal should read: "(1) The only substance of class II whose carriage in fixed tanks and in demountable tanks is authorized is phosphorus of 1°. "(2) However, white or yellow phosphorus (1°) and newly-quenched charcoal, powdered or granulated (8°) of class II may be carried in tank-containers.".
21 128	The beginning of the sentence which now becomes paragraph (1) should read: "(1) To be accepted for carriage, empty fixed tanks and empty demountable tanks which have contained . . .". Add a second paragraph: "(2) For tank-containers, see marginals 212 707 and 215 704.".
31 121	This marginal should read: "(1) All the liquids of Class IIIa except nitromethane (3°) may be carried in fixed tanks and in demountable tanks.". "(2) All substances of class IIIa except nitromethane (mononitromethane) (3°) may be carried in tank-containers.".
31 122- 31 126	Amend this entry to read: "31 122- 31 127"
31 127	Delete this marginal.
31 128	The beginning of this sentence which now becomes paragraph (1) should read: "(1) To be accepted for carriage, empty fixed tanks and empty demountable tanks which have contained . . .". Add a second paragraph: "(2) For tank-containers, see marginal 212 707.".
32 121	This sentence becomes paragraph (1). "(1) Molten sulphur . . .". Add a second paragraph: "(2) However, sulphur (2°), phosphorus sesquisulphide and phosphorus pentasulphide (8°) and naphthalene (11°) of class IIIb may be carried in tank-containers.".
32 122- 32 170	Amend this entry to read: "32 122- 32 127"
32 128	Insert a new marginal: "*Empty tanks* For tank-containers, see marginal 212 707.". Insert the following entry to continue the number of marginals: "32 129- 32 170"
32 400	At the end of the sentence, add the words: "and tank-containers".
33 121 (1)	The end of paragraph (1) should read: " . . . in fixed tanks or demountable tanks.".
(2)	Replace this paragraph by the following text: "(2) The substances of 1° to 3°, the solutions of 4° and moist sodium chlorate of class IIIc may be carried in tank-containers.".
33 122- 33 126	Amend this entry to read: "33 122- 33 127"
33 127	Delete this marginal.

33 128 In paragraphs (1) and (2), replace "empty tanks" by "empty fixed tanks and empty demountable tanks".
Add a third paragraph:
"(3) For tank-containers, see marginal 212 707.".

41 121 (1) This paragraph should read:
"(1) Liquids of 1° (b) and 31° (b), the named substances of 81° to 83° except dimefox, HETP, mevinphos, parathion, sulfotep and TEPP of 81° (a), acrylonitrile (2° (a)), acetonitrile (2° (b)), allyl chloride (4° (a)), 2 - cyanopropane-2-ol (11° (a)), aniline (11° (b)), 1-chloro-2,3-epoxypropane (12° (a)), glycol chlorohydrin (12° (b)), allyl alcohol (13° (a)), dimethyl sulphate (13° (b)), phenol (13° (c)), cresols (22° (a)) and xylenols (22° (b)) may be carried in fixed tanks or in demountable tanks.".
The end of paragraph (2) should read as follows:
" . . . in tank-vehicles or in demountable tanks specially designed for the purpose.".
Replace this paragraph by the following text:
"(3) The following substances of marginal 2401 may be carried in tank-containers:
Acrylonitrile (2° (a)), acetonitrile (methyl cyanide) (2° (b)), aqueous solutions of ethyleneimine (3°), allyl chloride (4° (a)), methyl chloroformate (4° (b)), ethyl chloroformate (4° (c)), 2 - cyanopropane-2-ol (acetone cyanohydrin) (11° (a)), aniline (11° (b)), 1-chloro-2,3-epoxypropane (epichlorohydrin) (12° (a)), 2-2-dichlorodiethyl ether (chloroethyl ether, 2-chloroethyl ether) (12° (f)), allyl alcohol (13° (a)), dimethyl sulphate (13° (b)), phenol (13° (c)), lead alkyls (14°), 2-bromophenylacetonitrile (bromobenzyl cyanide) (21° (a)), phenylcarbylamine chloride (21° (b)), 2-4-diisocyanatotoluene (21° (c)) and its mixtures with 2,6-diisocyanatotoluene (which are assimilated to it), allyl isothiocyanate (21° (d)), chloroanilines (21° (e)), mononitroanilines and dinitroanilines (21° (f)), naphthylamines (21° (g)), 2,4-diaminotoluene (21° (h), dinitrobenzenes (21° (i)), chloronitrobenzenes (21° (k)), mononitrotoluenes (21° (l)), dinitrotoluenes (21° (m)), nitroxylenes (21° (n)), toluidines (21° (o)), xylidines (21° (p)), cresols (22° (a)), xylenols (22° (b)), xylyl bromide (23° (a)), phenacyl chloride (ω-chloroacetophenone) (23° (b)), phenacyl bromide (ω-bromoacetophenone) (23° (c)), 4-chloroacetophenone (methyl p-chlorophenylketone (23° (d)), symmetrical dichloroacetone (23° (e)), solutions of inorganic cyanides (31° (b)), ethylene dibromide (symmetrical dibromoethane) (61° (a)) and carbon tetrachloride, chloroform and methylene chloride (which are assimilated to it), methyl chloroacetate (61° (e)), ethyl chloroacetate (61° (f)), benzyl chloride (61° (k)), benzene trichloride which is assimilated to substances of 62°, and substances and preparations used as pesticides (81°-83°).

41 127 (1) Delete this paragraph.

(2) Delete the figure "(2)".

41 128 The beginning of paragraph (1) should read:
"(1) To be accepted for carriage, empty fixed tanks and empty demountable tanks must not be contaminated . . .".
Insert a second paragraph:
"(2) For tank-containers, see marginal 212 707.". Existing paragraph (2) should be renumbered "(3)" and the beginning of the paragraph should read:
"(3) Empty demountable tanks and empty tank-containers of item 91° . . .".

42 127 This marginal should read:
"The provisions concerning tank-containers are the same as those set forth in Appendix B.1 for fixed tanks and demountable tanks.".

51 121 (1)	At the end of paragraph (1), replace "or in large movable tanks" by "or in demountable tanks".
(2)	Paragraph (2) should read: "(2) All substances of marginal 2501 or covered by a collective heading may, if their physical state so permits, be carried in tank-containers.".
51 122- 51 126	Amend this entry to read: "51 122- 51 127"
51 127	Delete this marginal.
51 128	The beginning of paragraph (1) should read: "(1) Empty fixed tanks and empty demountable tanks of 51° must be closed . . .". Insert a second paragraph: "(2) For tank-containers, see marginal 212 707.". Existing paragraph (2) should be renumbered "(3)" and the beginning of this paragraph amended to read: "(3) Tank containers and demountable tanks which have . . .".
71 121	This marginal should read: "(1) Substances of 10°, 14° and 15° may be carried in fixed tanks and in demountable tanks. "(2) These substances may also be carried in tank-containers.".
71 122- 71 126	Amend this entry to read: "71 122- 71 127"
71 127	Delete this marginal.
71 128	This marginal should read: "(1) To be accepted for carriage, empty fixed tanks and empty demountable tanks of 99° must be closed in the same way, and be as leak-proof, as if they were full. "(2) For tank-containers, see marginal 212 707.".
71 401	The end of this marginal should read: " . . . nor more than 5,000 kg of substances of 45°, 46°(b) and (c), 47°(b), 48°, 49°(b), 50° to 53° and 55°, nor more than 10,000 kg of substances of 54°.".
71 600- 209 999	Amend this entry to read: "71 600- 199 999"

APPENDICES

Insert:

"PROVISIONS COMMON TO APPENDICES B.1 AND B.1b CONCERNING TANKS

200 000 "(1) Appendix B.1 applies to tanks other than tank-containers and receptacles.

"(2) Appendix B.1b applies to tank-containers other than receptacles.

"(3) By derogation from the definition given in marginal 10 102 (1), the term tank, when used alone in Appendix B.1 and Appendix B.1a, does not cover tank-containers. However, some of the requirements of Appendices B.1 and B.1a may be made applicable to tank-containers by the provisions of Annex B and Appendix B.1b.

"(4) For receptacles, see the relevant requirements of Annex A (packages).

"(5) It is recalled that marginal 10 121 (1) prohibits the carriage of dangerous substances in tanks except where such carriage is expressly

authorized. Appendices B.1 and B.1b are therefore confined to provisions applicable to tanks and tank-containers used for transport operations which are expressly authorized.".

200 001-
209 999

Read the title of Appendix B.1:

"PROVISIONS CONCERNING FIXED TANKS (TANK-VEHICLES), BATTERIES OF RECEPTACLES AND DEMOUNTABLE TANKS"

Delete the "NOTES" to Appendix B.1.

210 002 Paragraph (4) should read:

"(4) Batteries of receptacles must be so stowed on the vehicle carrying them that they cannot shift during carriage even if they receive a violent jolt.".

210 142 (1) Replace sub-paragraph (e) by the following:

"(e) Vehicles intended for the carriage of gases of 12° shall be so constructed that the tanks are electrically earthed.".

210 146 Replace the text of this marginal by the following:

"The engine of the vehicle and, where appropriate, the engine driving the decanting pump shall be so equipped and placed, and the exhaust pipes shall be so directed or protected, as to avoid any danger to the load through heating or ignition.".

211 087-
211 999 Amend this entry to Read:

"211 087-
212 099"

Insert the following new appendix:

"*Appendix B.1b.* PROVISIONS CONCERNING TANK-CONTAINERS (DESIGN AND TESTING)

NOTE:

Chapter I sets out the requirements applicable to tank-containers intended for the carriage of substances of all Classes. Chapter II contains particular requirements supplementing or modifying the requirements of Chapter I.

Chapter I

REQUIREMENTS APPLICABLE TO ALL CLASSES

Section 1. GENERAL; SCOPE; DEFINITIONS

212 100 These requirements shall apply to tank-containers of a capacity of more than 0.45 cubic metre which are used for the carriage of liquid, gaseous, powdery or granular substances, and to their fittings and accessories.

212 101 A tank-container shall comprise a shell and items of equipment, including equipment to facilitate movement without change of attitude.

212 102 In the following requirements:

(1) (a) "Shell" means the tank proper (including the openings and their closures);

(b) "Service equipment" of the shell means filling and emptying, venting, safety, heating and heat-insulating devices, and measuring instruments; and

(c) "Structural equipment" means the reinforcing, fastening, protective or stablizing members external to the shell.

(2) (a) "Calculated pressure" means a theoretical pressure at least equal to the test pressure which according to the degree of danger exhibited by the substance being carried may exceed the working pressure more or less substantially. It is used solely to determine the thickness of the walls of the shell, to the exclusion of any external or internal reinforcing device;

(b) "Maximum working pressure" means the highest of the following three pressures:

1. The highest effective pressure allowed in the shell during filling ("maximum filling pressure allowed");
2. The highest effective pressure allowed in the shell during discharge ("maximum discharge pressure allowed"); and
3. The effective pressure to which the shell is subjected by its contents (including such extraneous gases as it may contain) when the temperature reaches 50°C ("total pressure");

(c) "Test pressure" means the highest effective pressure which arises in the shell during the pressure test;

(d) "Filling pressure" means the maximum pressure actually built up in the shell when it is being filled by pressure;

(e) "Discharge pressure" means the maximum pressure actually built up in the shell when it is being discharged by pressure.

(3) "Leakage test" means the test which consists of subjecting the shell to an effective internal pressure equal to the maximum working pressure, but not less than 0.2 kg/cm² (gauge pressure), by a procedure approved by the competent authority.

212 103-
212 199

Section 2. CONSTRUCTION

212 200 Shells shall be made of ductile metallic materials. For welded shells only a material whose weldability has been fully demonstrated shall be used. Welds shall be skilfully made and afford complete safety. The materials of shells and of their protective linings which are in contact with the contents carried shall not contain substances liable to react dangerously with the latter to form dangerous compounds, or substantially to weaken the material.

212 201 Shells, their attachments and their service and structural equipment shall be designed to withstand at least the static and dynamic stresses in normal carriage without loss of contents.*

212 202 The pressure on which the dimensioning of the tank-container shell is based shall be not less than the calculated pressure, but the stresses referred to in marginal 212 201 shall also be taken into account.

212 203 Except where special conditions laid down for the various classes provide otherwise, the following minimum requirements shall be taken into account in the design of shells:

(1) The shell of a gravity-discharge tank-container intended for the carriage of substances having at 50°C a total pressure (i.e. vapour pressure plus partial pressure of inert gases, if any) or not more than 1.1 kg/cm² (absolute) shall be designed for a test pressure of twice the static pressure of the liquid to be carried, but not less than twice the static pressure of water;

(2) The shell of a pressure-filled or pressure-discharge tank-container intended for the carriage of substances having at 50°C a total pressure (i.e. vapour pressure plus partial pressure of inert gases, if any) of not more than 1.1 kg/cm² (absolute) shall be designed for a test pressure equal to 1.3 times the filling or discharge pressure;

(3) The shell of a tank-container—whatever its filling or discharge system—intended for the carriage of substances having at 50°C a total pressure (i.e. vapour pressure plus partial pressure of inert gases, if any)

* If there are degassing vents, this shall not apply to quantities of gas escaping through them.

of not less than 1.1 and not more than 1.75 kg/cm² (absolute) shall be designed for a test pressure of at least 1.5 kg/cm² (gauge pressure), or of 1.3 times the filling or discharge pressure if the filling or discharge pressure is higher;

(4) The shell of a tank-container—whatever its filling or discharge system—intended for the carriage of substances having at 50°C a total pressure (i.e. vapour pressure plus partial pressure of inert gases, if any) of more than 1.75 kg/cm² (absolute) shall be designed for a test pressure equal to the higher of the following two pressures: 1.5 times the total pressure at 50°C, less 1 kg/cm², subject to a minimum of 4 kg/cm² (gauge pressure); and 1.3 times the filling or discharge pressure.

212 204 Tank-containers intended to contain certain dangerous substances shall be provided with additional protection, which may take the form of additional thickness of the shell (such additional thickness being determined in the light of the dangers inherent in the substances concerned: see the relevant classes) or of a protective device.

212 205 At the calculated pressure or the test pressure whichever is the higher, the stress σ (sigma) at the most severely stressed point of the shell shall conform to the material-dependent limits prescribed below. In addition, in choosing the material and determining wall thickness, the maximum and minimum filling and working temperatures should be taken into account, with particular reference to the risk of brittle fracture.

(1) For metals and alloys exhibiting a clearly-defined yield point or characterized by a guaranteed conventional yield stress Re (generally 0.2 per cent of residual elongation):

(a) Where the ratio Re/Rm is not more than 0.66 (Re = apparent yield stress or 0.2 per cent proof stress; Rm = guaranteed minimum tensile strength)

$$\sigma \leq 0.75\ Re$$

(b) Where the ratio Re/Rm exceeds 0.66

$$\sigma \leq 0.5\ Rm$$

(2) For metals and alloys exhibiting no apparent yield stress and characterized by a guaranteed minimum tensile strengh Rm:

$$\sigma \leq 0.43\ Rm$$

(3) The elongation at fracture,* in per cent, shall be not less than $\frac{1{,}000}{Rm}$, but shall be not less than 20 per cent in the case of steel and not less than 12 per cent in the case of aluminium alloys.

212 206 Tank-containers intended for the carriage of inflammable liquids having a flashpoint of not more than 55°C and for the carriage of inflammable gases shall be capable of being electrically earthed.

212 207 Tank-containers shall be capable of absorbing the forces specified in paragraph (1) and the wall thickness of the shells shall be as prescribed in paragraphs (2) - (4) below.

(1) Tank-containers and their fastenings shall under the maximum permissible load be capable of absorbing the following forces:
—in the direction of travel: twice the total weight;

* The specimens used to determine the elongation at fracture shall be taken transversely to the direction of rolling and be so secured that:

$$L_o = 5d$$

where L_o = length of the specimen before the text; and
d = diameter.

—horizontally at right angles to the direction of travel: the total weight; (where the direction of travel is not clearly determined, the maximum permissible load shall be twice the total weight);
—vertically upwards: the total weight; and
—vertically downwards: twice the total weight.

Under each of these forces the safety factors to be observed shall be the following:

—for metals having a clearly-defined yield point: a safety factor of 1.5 in relation to the apparent yield stress; or

—for metals with no clearly-defined yield point: a safety factor of 1.5 in relation to the guaranteed 0.2-per-cent proof stress.

(2) The minimum wall thickness of the shell barrel shall be calculated by the following formula:

$$e = \frac{P \times D}{200 \times \sigma} \text{ mm}$$

where P = calculated pressure or test pressure, whichever is the higher in kg/cm²;
D = internal diameter of shell in mm; and
σ = permissible stress as defined in marginal 212 205, paragraphs 1(a), 1(b) and 2, in the kg/mm².

The thickness shall in no case be less than that prescribed in paragraphs (3) and (4) below.

(3) The barrels and ends of shells not more than 1.80 m in diameter shall be not less than 5 mm thick if of mild steel* (as specified in marginal 212 205) or of equivalent thickness if of another metal. Where the diameter exceeds 1.80 m this thickness shall be increased to 6 mm if the tank is of mild steel* (as specified in marginal 212 205) or to an equivalent thickness if the tank is of another metal.

(4) Where additional protection of the shell against damage is provided, the competent authority may allow the aforesaid minimum thicknesses to be reduced in proportion to the protection provided; however, the said thicknesses shall be not less than 3 mm in the case of mild steel*, or than an equivalent thickness in the case of other materials, for shells not more than 1.80 m in diameter. For shells with a diameter exceeding 1.80 m the aforesaid minimum thickness shall be increased to 4 mm in the case of mild steel* and to an equivalent thickness in the case of another metal.

212 208 Tank-containers shall be carried only on vehicles whose fastenings are capable, under the maximum permissible load on the tank-containers, of absorbing the forces specified in marginal 212 207 (1) above.

212 209-
212 299

Section 3. ITEMS OF EQUIPMENT

212 300 The items of equipment shall be so arranged as to be protected against the risk of being wrenched off or damaged during carriage and handling. If the connexion between the frame and the shell allows relative movement as between these sub-assemblies, the items of equipment shall be so fastened as to permit such movement without risk of damage to working parts.

The items of equipment shall exhibit a suitable degree of safety comparable to that of the shell.

In addition, particular conditions applicable to bottom-discharge tank-containers are prescribed in marginal 212 301 below.

* "Mild steel" means a steel having a breaking strength between 37 and 44 kg/mm².

212 301 Every bottom-discharge tank-container, and in the case of compartmented bottom-discharge tank-containers every compartment, shall be equipped with two mutually independent shut-off devices, the first being an internal stop-valve* fixed directly to the shell and the second being a sluice-valve or other equivalent device**, mounted in series, one at each end of the discharge pipe. The internal stop-valve shall be operable from above or from below. If possible, the setting—open or closed—of the internal stop-valve shall be capable of being verified from the ground in both cases. Internal-stop-valve control devices shall be so designed as to prevent any unintended opening through impact or an inadvertent act.

The internal shut-off device shall continue to be effective in the event of damage to the external control device. In order to avoid any loss of contents in the event of damage to the external discharge fittings (pipes, lateral shut-off devices), the internal stop-valve and its seating shall be protected against the danger of being wrenched off by external stresses or shall be so designed as to resist them. The filling and discharge devices (including flanges or threaded plugs) and protective caps (if any) shall be capable of being secured against any unintended opening.

212 302 A tank-container or each of its compartments shall, save where it is intended for the carriage of deeply refrigerated gases, be provided with an opening large enough to enable the tank-container or compartment to be inspected.

212 303 A tank-container intended for the carriage of liquids having a vapour pressure of not more than 1.1 kg/cm² (absolute) at 50°C shall have a venting system and a safety device to prevent the contents from spilling out of the shell if the tank-container overturns, or shall conform to the requirements of marginal 212 304 or 212 305 below.

212 304 A tank-container intended for the carriage of liquids having a vapour pressure of not less than 1.1 and not more than 1.75 kg/cm² (absolute) at 50°C shall have a safety valve set at not less than 1.5 kg/cm² (gauge pressure) and such that it is fully open at a pressure not exceeding the test pressure; or shall conform to the requirements of marginal 212 305.

212 305 A tank-container intended for the carriage of liquids having a vapour pressure of not less than 1.75 and not more than 3 kg/cm² (absolute) at 50°C shall be equipped with a safety valve set at a gauge pressure of not less than 3 kg/cm² and such that it is fully open at a pressure not exceeding the test pressure; or shall be hermetically sealed.

212 306 Moving parts such as covers, closures, etc., which are liable to come into frictional or percussive contact with aluminium tank-containers intended for the carriage of inflammable liquids having a flashpoint of not more than 55°C or for the carriage of inflammable gases shall not be made of unprotected corrodable steel.

212 307-
212 399

Section 4. TYPE APPROVAL

212 400 The competent authority or a body designated by that authority shall issue in respect of each new type of tank-container a certificate attesting that the prototype tank-container, including fastenings, which it has surveyed is suitable for the purpose for which it is intended and meets the construction requirements of section 2 and the equipment requirements

* Save as may be otherwise provided in the case of shells intended for the carriage of certain crystallizable or highly viscous substances.

** In the case of tank-containers of less than 1 m³ capacity, the sluice-valve or other equivalent device may be replaced by a blank flange.

of section 3. If the tank-containers are serially manufactured without modification, this approval shall be valid for the entire series. The test results, the substances for the carriage of which the tank-container is approved, and an approval number shall be specified in a test report. The approval number shall consist of the distinguishing sign* of the State in whose territory the approval was granted, and a registration number.

212 401-
212 499

Section 5. TESTS

212 500 Shells and their items of equipment shall either together or separately undergo an initial inspection before being put into service and shall thereafter undergo periodic inspections. The initial inspection shall include a check of the design characteristics, an internal and external examination and a hydraulic pressure test. If the shells and their items of equipment are tested separately they shall after assembly be jointly subjected to a leakage test. The periodic inspections shall include an external and internal examination and, as a general rule, a hydraulic pressure test. Sheathing for thermal insulation and the like shall be removed only to the extent required for reliable appraisal of the tank-container's characteristics. The initial and periodic pressure tests shall be carried out, by an expert approved by the competent authority, at the test pressure indicated on the data plate of the tank-container, except in cases where lower test pressures are authorized for the periodic tests. In special cases, and with the agreement of the competent authority, the hydraulic pressure test may be replaced by a pressure test using another liquid or a gas.

212 501 Tank-containers shall, before being put into service and thereafter at intervals not exceeding five years, be tested in conformity with the provisions of marginal 212 500 above. Before tank-containers are put into service, and thereafter at intervals not exceeding two and one-half years, all the equipment shall be checked for leakproofness and satisfactory operation.

212 502 Certificates showing the results of these tests shall be issued by the expert approved by the competent authority.

212 503-
212 599

Section 6. MARKING

212 600 Each tank-container shall be fitted with a corrosion-resistant metal plate permanently attached to the shell in a place readily accessible for inspection. The following particulars at least shall be marked on the plate by stamping or by any other similar method. The particulars may be engraved directly on the walls of the shell itself if the walls are so reinforced that the strength of the shell is not impaired.

—Approval number;
—Manufacturer's name or mark;
—Manufacturer's serial number;
—Year of manufacture;
—Test pressure in kg/cm² (gauge pressure);
—Capacity in litres; in the case of multiple-element tank-containers: the capacity of each element;
—Design temperature (only if above +50°C or below −20°C);
—Month and year of initial test and of most recent periodic test; and
—Stamp of the expert who carried out the tests.

On pressure-filled or pressure-discharge tank-containers the maximum working pressure allowed shall be inscribed in addition.

* Distinguishing sign for use in international traffic prescribed by the Convention on Road Traffic (Vienna, 1968).

212 601 The following particulars shall be inscribed either on the tank-container itself or on a board:
—The names of the owner and of the operator;
—The capacity of the shell;
—The unladen (tare) weight;
—The maximum permissible laden weight; and
—The name of the substance being carried.*
In addition, tank-containers shall bear the prescribed danger labels.

212 602-
212 699

Section 7. OPERATION

212 700 During carriage, tank-containers shall be fixed on the carrying vehicle in such a way as to be adequately protected by the fittings of the carrying vehicle or of the tank-container itself against lateral and longitudinal impact and against overturning.** If the shells and the service equipment are so constructed as to withstand impact or overturning they need not be protected in this way.

212 701 Tank-containers shall not be loaded with any dangerous substance other than those for whose carriage they have been approved.

212 702 The following degrees of filling shall not be exceeded in tank-containers intended for the carriage of liquids at ambient temperatures:
(1) (a) Inflammable substances not exhibiting additional risks (e.g. not toxic or corrosive) in tank-containers with a venting system and with or without safety valves:

$$\text{degree of filling } \frac{100}{1 + \alpha\,(50 - t_F)} \text{ or } \frac{100}{1 + 35\,\alpha} \text{ \% of capacity;}$$

(b) Toxic or corrosive substances, whether or not exhibiting an inflammability risk, in tank-containers with a venting system and with or without safety valves:

$$\text{degree of filling } \frac{98}{1 + \alpha\,(50 - t_F)} \text{ or } \frac{98}{1 + 35\,\alpha} \text{ \% of capacity;}$$

(c) Low-concentration inflammable substances and low-concentration acids and lyes in closed tank-containers:

$$\text{degree of filling } \frac{97}{1 + \alpha\,(50 - t_F)} \text{ or } \frac{97}{1 + 35\,\alpha} \text{ \% of capacity;}$$

(d) High-concentration toxic substances and high-concentration acids and lyes in closed tank-containers:

$$\text{degree of filling } \frac{95}{1 + \alpha\,(50 - t_F)} \text{ or } \frac{95}{1 + 35\,\alpha} \text{ \% of capacity.}$$

(2) In these formulae α is the mean coefficient of cubical expansion of the liquid between 15° and 50°C, i.e. for a maximum variation in temperature of 35°C.

α is calculated by the formula: $\dfrac{d_{15} - d_{50}}{35 \times d_{50}}$

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* A collective description or an index number may be given instead of the name.

** Examples of protection of shells:
1. Protection against lateral impact may for example consist of longitudinal bars protecting the shell on both sides at the level of the median line.
2. Protection against overturning may for example consist of reinforcing rings or bars fixed transversally in relation to the frame.
3. Protection against rear impact may for example consist of a bumper or frame.

in which d_{15} and d_{50} are the density of the liquid at 15°C and 50°C respectively. t_F is the mean temperature of the liquid during filling.

(3) The provisions of marginal 212 702 (1) above shall not apply to tank-containers whose contents are maintained by means of a heating device at a temperature above 50°C during carriage. In such a case the degree of filling at the outset shall be such and the temperature shall be so regulated that the tank-container is not full to more than 95 per cent of its capacity at any time during carriage.

212 703 If the shells of tank-containers intended for the carriage of liquids* are not divided by partitions or surge plates into sections of not more than 5,000 litres capacity, the said shells shall be filled to not less than 80 per cent of their capacity unless they are practically empty.

212 704 Tank-containers shall be closed so that the contents cannot run out uncontrolled.

212 705 Where several closure systems are fitted in a series, that nearest to the substance being carried shall be closed first.

212 706 No residue of the dangerous substance being carried shall adhere to the outside of a tank-container during carriage.

212 707 To be accepted for carriage, empty tank-containers shall be closed in the same manner and leakproof in the same degree as though they were full.

212 708-
212 799

Section 8. TRANSITIONAL MEASURES

212 800 (1) Tank-containers of a capacity below 1,000 litres built before the entry into force of these requirements and not conforming to them may, if they were built in conformity with the requirements of ADR and RID concerning receptacles, be used during a period of three years immediately following the entry into force of these requirements for the carriage of liquid, gaseous, powdery or granular substances.

(2) Tank-containers of a capacity of not less than 1,000 litres may, with the approval of the competent authority of the countries in which they are to be carried, be used during a period of five years immediately following the entry into force of these requirements for the carriage of liquid, gaseous, powdery or granular substances.

212 801-
213 099

Chapter II

PARTICULAR REQUIREMENTS SUPPLEMENTING OR MODIFYING THE REQUIREMENTS OF CHAPTER I

CLASS Id

GASES: COMPRESSED, LIQUEFIED OR DISSOLVED UNDER PRESSURE

Section 1. GENERAL; SCOPE; DEFINITIONS

213 100-
213 199

Section 2. CONSTRUCTION

213 200 The shells of tank-containers intended for the carriage of substances of 1° to 10° and 14° shall not be made of aluminium or aluminium alloy.

* Substances whose efflux time at 20°C from a DIN cup with a 4 mm orifice is less than 10 minutes (corresponding to an efflux time of less than 96 sec. at 20°C from a No. 4 Ford cup, or less than 2,680 centistokes) shall be deemed to be liquids for the purposes of this provision.

213 201 The requirements of marginals 211 050 to 211 086 shall apply to the materials and construction of the shells of tank-containers intended for the carriage of gases of 11° to 13°.

213 202 The shells of tank-containers intended for the carriage of hydrogen fluoride (anhydrous hydrofluoric acid) (5°) shall be designed for a calculated pressure of 21 kg/cm² (gauge pressure).

213 203-
213 299

Section 3. ITEMS OF EQUIPMENT

213 300 In addition to being equipped with the devices prescribed in marginal 213 301, the discharge pipes of tank-container shells shall be capable of being closed by blank flanges or some other equally reliable device.

213 301 The shells of tank-containers intended for the carriage of liquefied gases may be equipped, in addition to the filling, discharge and gas-pressure-equalizing orifices, with openings in which gauges, thermometers and manometers can be fitted.

213 302 Safety valves shall meet the conditions prescribed in paragraphs (1), (2) and (3) below.

(1) The shells of tank-containers intended for the carriage of gases of 1° to 10° and 14° may be fitted with not more than two safety valves. The safety valves shall be capable of opening automatically under a pressure of from 0.9 to 1.0 times the test pressure of the shell to which they are fitted. They shall in addition be constructed in such a way that in the event of total fire engulfment the pressure inside the shell does not exceed the test pressure. They shall be of such a type as to resist dynamic stresses, including liquid surge. The use of deadweight or counterweight valves is prohibited.

The shells of tank-containers intended for the carriage of gases of 1° to 14° harmful to the respiratory organs or entailing a poison risk* shall not have safety valves unless the safety valves are preceded by a bursting disc. In the latter case the arrangement of the bursting disc and the safety valve shall be to the satisfaction of the competent authority.

(2) The shells of tank-containers intended for the carriage of gases of 11° which are not in constant communication with the outside air, and of those intended for the carriage of gases of 12° and 13°, shall be fitted with two independent safety valves each so designed as to permit evacuation of the gases from the shell in such a way that the pressure does not at any time exceed the working pressure indicated on the tank-container by more than 10 per cent. In addition, the shells of such tank-containers may be fitted with bursting discs in series with and preceding the safety valves. In such a case the arrangement of the bursting disc and the safety valve shall be to the satisfaction of the competent authority.

(3) The safety valves of the shells of tank-containers intended for the carriage of gases of 11° to 13° shall be capable of opening at the working pressure indicated on the tank-container. They shall be so designed as to function faultlessly even at the lowest working temperature. The reliability of their operation at the lowest temperature shall be estab-

* The following are deemed to be compressed gases harmful to the respiratory organs for entailing a poison risk: carbon monoxide, water gas, synthetic gases, town gas, compressed oil gas, boron trifluoride, and mixtures of carbon monoxide, water gas, synthetic gases or town gas.

The following are deemed to be liquefied gases harmful to the respiratory organs or entailing a poison risk: hydrogen bromide (anhydrous hydrobromic acid), hydrogen fluoride (anhydrous hydrofluoric acid), hydrogen sulphide (sulphuretted hydrogen), ammonia, chlorine, sulphur dioxide (anhydrous sulphurous acid), nitrogen dioxide (nitrogen peroxide; nitrogen tetroxide), T gas, methyl vinyl ether, chloromethane (methyl chloride), bromomethane (methyl bromide), phosgene (carbonyl chloride), vinyl bromide, methylamine (monomethylamine), dimethylamine, trimethylamine, ethylamine (monoethylamine), ethylene oxide, methanethiol (methyl mercaptan), mixtures of carbon dioxide with ethylene oxide and liquefied hydrogen chloride (anhydrous hydrochloric acid).

lished and checked either by testing each valve or by testing a specimen valve of each type.

213 303 An internal flow-restricting valve or equivalent device shall be fitted to every orifice more than 1.5 mm in diameter provided in the shell for the passage of gases or liquids, other than orifices carrying safety valves.

213 304 Thermal insulation.

(1) If the shells of tank-containers intended for the carriage of liquefied gases of 4° to 8° are equipped with thermal insulation, such insulation shall be subject to the special provisions under (3) below either:

—Consist of a sun shield covering not less than the upper third but not more than the upper half of the tank-container's surface and separated from the shell by an air space about 4 cm across; or

—Consist of a complete cladding, of adequate thickness, of insulating materials.

The thermal insulation shall be so designed as not to hinder access to the filling and discharge devices.

(2) The shells of tank-containers intended for the carriage of butadiene (6°), methyl vinyl ether, ethylene oxide, vinyl bromide (8°(a)) and monochlorotrifluoroethylene (8°(b)) shall be protected by a sun-shield as defined above.

(3) The shells of tank-containers intended for the carriage of gases of 11° to 13° shall be thermally insulated. The thermal insulation shall be protected against impact by means of continuous metal sheathing. If the space between the shell and the metal sheathing is under vacuum (vacuum insulation), the protective sheathing shall be so designed as to withstand without deformation an external pressure of at least 1 kg/cm² (gauge pressure). If the sheathing is so closed as to be gas-tight, a device shall be provided to prevent any dangerous pressure from developing in the insulating layer in the event of inadequate gas-tightness of the shell or of its items of equipment. The device shall prevent the infiltration of moisture into the heat-insulating sheath.

(4) The shells of tank-containers intended for the carriage of liquid air, liquid oxygen or liquid mixtures of oxygen with nitrogen (11°) shall not include any combustible material either in the thermal insulation or in the fastening to the frame.

213 305 In the case of multiple-element tank-containers, the following conditions shall be met.

(1) If one of the elements of a multiple-element tank-container is fitted with a safety valve and shut-off devices are provided between the elements, every element shall be so fitted.

(2) The filling and discharge devices may be fitted to a manifold.

(3) Each element of a multiple-element tank-container intended for the carriage of compressed gases harmful to the respiratory organs or entailing a poison risk* shall be capable of being isolated by a valve.

(4) The elements of a multiple-element tank-container intended for the carriage of liquefied gases harmful to the respiratory organs or entailing a poison risk ** shall be so designed that they can be filled separately and be kept isolated by a sealed valve.

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* The following are deemed to be compressed gases harmful to the respiratory organs or entailing a poison risk: carbon monoxide, water gas, synthetic gases, town gas, compressed oil gas, boron trifluoride, and mixtures of carbon monoxide, water gas, synthetic gases or town gas.

** The following are deemed to be compressed gases harmful to the respiratory organs or entailing a poison risk: hydrogen bromide (anhydrous hydrobromic acid), hydrogen fluoride (anhydrous hydrofluoric acid), hydrogen sulphide (sulphuretted hydrogen), ammonia, chlorine, sulphur dioxide (anhydrous sulphurous acid), nitrogen dioxide (nitrogen peroxide; nitrogen tetroxide), T gas, methyl vinyl ether, chloromethane (methyl chloride), bromomethane (methyl bromide), phosgene (carbonyl chloride), vinyl bromide, methylamine (monomethylamine), dimethylamine, trimethylamine, ethylamine (monoethylamine), ethylene oxide, methanethiol (methyl mercaptan), mixtures of carbon dioxide with ethylene oxide and liquefied hydrogen chloride (anhydrous hydrochloric acid).

213 306-
213 399

Section 4. TYPE APPROVAL

213 400-
212 499 (No special requirements)

Section 5. TESTS

213 500 The materials of the shells of tank-containers intended for the carriage of gases of 11° to 13° shall be tested by the method described in marginals 211 075 to 211 086.

213 501 The test pressure shall be as follows:

(1) Tank-containers intended for the carriage of gases of 1° to 3°, in conformity with marginal 2149 (1);

(2) Tank-containers intended for the carriage of gases of 4° to 8°, in conformity with marginal 2150 (2) if the shells are not more than 1.5 in diameter, and in conformity with marginal 210 141 (2) (b) if the shells are more than 1.5 m in diameter;

(3) Tank-containers intended for the carriage of gases of 9° and 10°, in conformity with marginal 2150 (3) and (4), and in conformity with marginal 210 141 (3) (b) in the case of multiple-element tank-containers whose elements are interconnected and form a battery, are not isolated from one another, and are encased in a thermal insulation;

(4) Tank-containers intended for the carriage of ammonia dissolved under pressure (14°), in conformity with marginal 210 141 (6);

(5) (a) Tank-containers fitted with safety valves and intended for the carriage of gases of 11° to 13°: 1.5 times the working pressure indicated on the shells, but not less than 3 kg/cm² (gauge pressure); for tank-containers with vacuum insulation the test pressure shall be 1.5 times the working pressure increased by 1 kg/cm².

(b) In the case of tank-containers without safety valves and intended for the carriage of gases of 11°, the first test shall be performed at 2 kg/cm² (gauge pressure) and the periodic tests at 1 kg/cm² (gauge pressure).

213 502 The first hydraulic pressure test shall be carried out before thermal insulation is applied.

213 503 The capacity of the shell of each tank-container intended for the carriage of gases of 4° to 8° and 14° shall be determined, under the supervision of an expert approved by the competent authority, by weighing or volumetric measurement of the quantity of water required in order to fill the shell. The measurement of shell capacity shall be accurate to within 1 per cent. Determination by a calculation based on the dimensions of the shell is not permitted. The maximum permissible weights of filling according to marginals 2154 (1) and 210 141 (5) shall be prescribed by an approved expert.

213 504 All welds in the shell shall be non-destructively tested radiographically or ultrasonically.

213 505 Notwithstanding the requirements of marginals 212 500 and 212 501, the periodic tests shall take place:

(1) Every two and one-half years in the case of tank-containers intended for the carriage of town gas (1°(b)), boron trifluoride (3°), hydrogen bromide, hydrogen fluoride, hydrogen sulphide, chlorine, sulphur dioxide and nitrogen peroxide (5°), phosgene (8°(a)) and liquefied hydrogen chloride (anhydrous hydrochloric acid) (10°);

(2) After six years' service in the case of tank-containers, without safety valves, intended for the carriage of gases of 11°;

(3) After eight years' service and thereafter every 12 years in the case of tank-containers fitted with safety valves and intended for the car-

riage of gases of 11° and of tank-containers intended for the carriage of gases of 12° and 13°. A leakage check may be performed, at the request of the competent authority, between any two successive tests.

213 506 At the periodic tests for tank-containers equipped with vacuum insulation and intended for the carriage of gases of 11° to 13°, the hydraulic test may be replaced by a leakage test performed either with the gases which the tank-containers are intended to contain or with an inert gas.

213 507 If, at the time of periodic inspections, manholes are made in the shells of tank-containers intended for the carriage of gases 11° to 13°, the method by which they are hermetically closed before the tank-containers are returned to service shall be one approved by the approved expert and shall ensure the integrity of the shell.

213 508-
213 599

Section 6. MARKING

213 600 In addition, the following particulars shall be marked by stamping or by any other equivalent method on the plates prescribed in marginal 212 600 or directly on the walls of the shell itself if the walls are so reinforced that the strength of the shell is not impaired.

(1) On tank-containers intended for the carriage of only one substance:

The name of the gas in full.

This shall be accompanied, in the case of tank-containers intended for the carriage of compressed gases of 1° to 3° by the tank-container's maximum permitted loading pressure and, in the case of tank-containers intended for the carriage of liquefied gases of 4° to 13° and of ammonia dissolved under pressure of 14°, by the permissible maximum load in kg.

(2) On multi-purpose tank-containers:

—The names, in full, of the gases for whose carriage the tank-container is approved followed by particulars of the permissible maximum load, in kg, for each of them.

(3) On tank-containers equipped with safety valves and intended for the carriage of gases of 11°, and on tank-containers intended for the carriage of gases of 12° and 13°:

—The working pressure.

(4) On tank-containers equipped with thermal insulation the expression "thermally insulated" shall be inscribed in one of the official languages of ADR.

213 601 The frame of a multiple-element tank-container shall be fitted near the filling point with a plate specifying:

—The test pressure of the elements;
—The working pressure of elements intended for compressed gases;
—The number of elements;
—The aggregate capacity of the elements, in litres;
—The name of the gas in full; and, in the case of liquefied gases,
—The permissible maximum load per element in kg.

213 602-
213 699

Section 7. OPERATION

213 700 In tank-containers usable for the successive carriage of different liquefied gases (multi-purpose tank-containers), only substances listed in the same one of the following groups may be carried:

Group 1: hydrocarbons of 6° and 7°;
Group 2: chloro and fluoro derivatives of the hydrocarbons of 8°(b) and 8°(c);

Group 3: ammonia (5°), methylamine, dimethylamine, trimethylamine and ethylamine (8°(a));

Group 4: methyl chloride, methyl bromide, ethyl chloride and vinyl chloride (8°(a));

Group 5: T gas (5°) and ethylene oxide (8°(a));

Group 6: liquid air, liquid oxygen, liquid nitrogen, also when mixed with rare gases; liquid mixtures of oxygen with nitrogen, also when they contain rare gases; and liquid rare gases (11°);

Group 7: liquid methane, liquid ethane, liquid mixtures of methane with ethane, also when they contain propane and butane; liquid ethylene (12°):

213 701 Tank-containers which have been filled with one of the substances of a group shall be completely emptied of liquefied gas and blown down before being loaded with another substance belonging to the same group.

213 702 The multiple use of tank-containers for the carriage of liquefied gases of the same group shall be allowed if all the requirements prescribed for the gases to be carried in one and the same tank-container are observed. Such multiple use shall be subject to approval by an approved expert.

213 703 The multiple use of tank-containers for the carriage of gases of different groups shall be allowed if permitted by the approved experts.

213 704 When loaded tank-containers or empty but uncleaned tank-containers are handed over for carriage, only the particulars applicable to the gas loaded or just discharged shall be visible; all particulars concerning other gases shall be covered up.

213 705 All the elements of a multiple-element tank-container shall contain only one and the same gas. In the case of a multiple-element tank-container intended for the carriage of liquefied gases harmful to the respiratory organs or entailing a poison risk,* the elements shall be filled separately and be kept isolated by a sealed valve.

213 706 The maximum permissible degrees of filling in kg/litre prescribed in marginals 2149 (2), 2150 (2), (3) and (4) and 210 141 (3) (b) and (6) shall be adhered to.

213 707 The degree of filling of the shells of tank-containers fitted with safety valves and intended for the carriage of gases of 11° to 13° shall be such that at the "alert" temperature, at which the vapour pressure is equal to the valve-opening pressure, the volume of the liquid does not exceed the permissible degree of filling of the shell at that temperature, i.e. 95 per cent in the case of inflammable gases and 98 per cent in the case of other gases.

213 708 On the shells of tank-containers intended for the carriage of liquid air and liquid oxygen or of liquid mixtures of oxygen with nitrogen (11°), substances containing grease or oil shall not be used to ensure leakproofness of the joints or for the maintenance of the closures.

213 709-
213 799

* The following are deemed to be liquefied gases harmful to the respiratory organs or entailing a poison risk: hydrogen bromide (anhydrous hydrobromic acid), hydrogen fluoride (anhydrous hydrofluoric acid), hydrogen sulphide (sulphuretted hydrogen), ammonia, chlorine, sulphur dioxide (anhydrous sulphurous acid), nitrogen dioxide (nitrogen peroxide; nitrogen tetroxide), T gas, methyl vinyl ether, chloromethane (methyl chloride), bromomethane (methyl bromide), phosgene (carbonyl chloride), vinyl bromide, methylamine (monomethylamine), dimethylamine, trimethylamine, ethylamine (monoethylamine), ethylene oxide, methanethiol (methyl mercaptan), mixtures of carbon dioxide with ethylene oxide and liquefied hydrogen chloride (anhydrous hydrochloric acid).

Section 8. TRANSITIONAL MEASURES

213 800-
214 099

CLASS IIIa
INFLAMMABLE LIQUIDS

Section 1. GENERAL; SCOPE; DEFINITIONS

214 100-
214 199

Section 2. CONSTRUCTION

214 200 The shells of tank-containers intended for the carriage of carbon disulphide (1°(a)) shall be designed for a calculated pressure of 10 kg/cm² (gauge pressure).

214 201-
214 299

Section 3. ITEMS OF EQUIPMENT

214 300 Tank-containers which are fitted with a venting system with no shut-off device, and which are intended for hte carriage of inflammable liquids having a flashpoint not exceeding 55°C, and tank-containers fitted with a safety valve shall have a flame-trap in the venting system.

214 301 All openings in the shells of tank-containers intended for the carriage of acrylaldehyde (acrolein), chloroprene (chlorobutadiene) and carbon disulphide (1°(a)) shall be above the surface level of the liquid. No piping or pipe connexions shall pass through the walls of the shell below the surface level of the liquid. The openings shall be capable of being hermetically closed and the closure shall be capable of being protected by a lockable cap.

214 302-
214 399

Section 4. TYPE APPROVAL

214 400-
214 499 (No special requirements)

Section 5. TESTS

214 500-
214 599 (No special requirements)

Section 6. MARKING

214 600-
214 699 (No special requirements)

Section 7. OPERATION

214 700 In the case of liquids having a vapour pressure of more than 1.75 kg/cm² (absolute) at 50°C, the following degrees of filling of hermetically closed shells shall not be exceeded: for methyl formate (1°(a)) and other liquids having a coefficient of cubical expansion of more than 150×10^{-5} but not more than 180×10^{-5} .....91 per cent of capacity; for acetaldehyde (5°) and other liquids having a coefficient of cubical expansion of more than 180×10^{-5} but not more than 230×10^{-5} but not more than 230×10^{-5} .....90 per cent of capacity.

214 701 An aluminium shell shall not be used for the carriage of acetaldehyde (5°) unless the shell is reserved solely for such carriage and the acetaldehyde is free from acid.

214 702 In the cold season (October to March), light distillates for cracking and other liquid hydrocarbons having a vapour pressure not exceeding 1.5 kg/cm² (absolute) at 50°C may be carried in shells of the type prescribed in marginal 212 303.

214 703 Carbon disulphide (1°(a)) shall not be carried otherwise than in hermetically closed shells or in shells equipped with valves set at not less than 3 kg/cm² (gauge pressure).

214 704-
214 799

Section 8. TRANSITIONAL MEASURES

214 800-
215 099

CLASS Ie
SUBSTANCES WHICH GIVE OFF INFLAMMABLE GASES ON CONTACT WITH WATER
CLASS II
SUBSTANCES LIABLE TO SPONTANEOUS COMBUSTION
CLASS IIIb
INFLAMMABLE SOLIDS

Section 1. GENERAL; SCOPE; DEFINITIONS

215 100-
215 199

Section 2. CONSTRUCTION

215 200 The shells of tank-containers intended for the carriage of trichlorosilane (silicochloroform) of marginal 2181, 4°, and of white or yellow phosphorus of marginal 2201, 1°, shall be designed for a calculated pressure of 10 kg/cm² (gauge pressure).

215 201-
215 299

Section 3. ITEMS OF EQUIPMENT

215 300 The openings and orifices (valves, ducts, manholes, etc.) in the shells of tank-containers intended for the carriage of substances of marginal 2181, 1° (a), shall be equipped with leakproof lockable caps, and such shells shall be equipped with thermal insulation so made of materials which are not readily inflammable that the temperature on the outer surface cannot rise above 50°C during carriage.

215 301 The shells of tank-containers intended for the carriage of white or yellow phosphorus of marginal 2201, 1°, shall meet the following requirements:

(1) The heating device shall not penetrate into the body of the shell but be fitted outside it. Other piping shall enter the shell in its upper part: openings shall be above the highest permissible level of the phosphorus and be capable of being completely enclosed under lockable caps.

(2) The shell shall be equipped with a gauging system for verifying the level of the phosphorus and, if water is used as the protective agent, with a fixed gauge mark showing the highest permissible level of water.

215 302 The shells of tank-containers intended for the carriage of sulphur of marginal 2331, 2° (b), and of naphthalene of marginal 2331, 11° (c), shall be equipped with thermal insulation so made of materials which are not readily inflammable that the temperature on the outer surface cannot rise above 50°C during carriage. They may be equipped with valves opening automatically inwards or outwards under the effect of a difference of pressure of 0.2 to 0.3 kg/cm². The discharge devices shall be capable of being protected by a lockable metal cap.

215 303-
215 399

Section 4. TYPE APPROVAL

215 400-
215 499 (No special requirements)

Section 5. TESTS

215 500 The shells of tank-containers intended for the carriage of trichlorosilane (silicochloroform) of marginal 2181, 4°, white or yellow phosphorus of marginal 2201, 1°, sulphur of marginal 2331, 2°, (the filling temperature must additionally be taken into account in the case of shells made of aluminium) and naphthalene of marginal 2331, 11°, shall be tested at a pressure of 4 kg/cm² (gauge pressure).

215 501-
215 599

Section 6. MARKING

215 600-
215 699 (No special requirements)

Section 7. OPERATION

215 700 For the carriage of substances of marginal 2181, 1° (a), caps shall be locked in conformity with marginal 215 300 and the temperature of the outside surface of the shell shall not exceed 50°C.

215 701 In the case of trichlorosilane (silicochloroform) of marginal 2181, 4°, the degree of filling shall not exceed 1.14 kg per litre of capacity if filling is by weight, or 85 per cent if filling is by volume.

215 702 White or yellow phosphorus of marginal 2201, 1°, shall if water is used as the protective agent be covered with a depth of not less than 12 cm of water at the time of filling; the degree of filling at a temperature of 60°C shall not exceed 98 per cent. If nitrogen is used as the protective agent, the degree of filling at a temperature of 60°C shall not exceed 96 per cent. The remaining space shall be filled with nitrogen in such a way that, even after cooling, the pressure at no time falls below the atmospheric pressure. The shell shall be hermetically closed so that no leakage of gas occurs.

215 703 The shells of tank-containers intended for the carriage of sulphur of marginal 2331, 2°, shall be filled to not more than 98 per cent of their capacity.

215 704 The shells of tank-containers which have contained phosphorus of marginal 2201, 1°, shall when handed over for carriage either:
—be filled with nitrogen; the sender must certify in the transport document that the tank, after closure, is gas-tight; or
—be filled with water to not less than 96 per cent and not more than 98 per cent of their capacity; between 1 October and 31 March this water shall contain one or more anti-freeze agents free from corrosive action, not liable to react with phosphorus, and sufficiently concentrated to prevent the water freezing during carriage.

215 705-
215 799

Section 8. TRANSITIONAL MEASURES

215 800-
216 099

CLASS IIIc
OXIDIZING SUBSTANCES
CLASS VII.
ORGANIC PEROXIDES

Section 1. GENERAL; SCOPE; DEFINITIONS

216 100-
216 199

Section 2. CONSTRUCTION

216 200 The shells of tank-containers, and their items of equipment, intended for the carriage of hydrogen peroxide or of aqueous solutions of hydrogen peroxide of marginal 2371, 1°, or for the carriage of liquid organic peroxides of marginal 2701, 10°, 14° and 15° shall be made of aluminium not less than 99.5 per cent pure or of suitable alloy steel not liable to cause the hydrogen peroxide or the organic peroxides to decompose.

216 201-
216 299

Section 3. ITEMS OF EQUIPMENT

216 300 The shells of tank-containers intended for the carriage of aqueous solutions of hydrogen peroxide containing more than 70 per cent hydrogen peroxide and of hydrogen peroxide of marginal 2371, 1°, shall have their openings above the surface level of the liquid. In the case of solutions containing more than 60 per cent but not more than 70 per cent hydrogen peroxide, openings below the surface level of the liquid shall be permissible. In this case the shell-discharge system shall include two mutually independent shut-off devices, the first being a quick-closing internal stop-valve of an approved type and the second a sluice-valve, mounted in series, one at each end of the discharge pipe. A blank flange or some other equally reliable device shall also be fitted to the outlet of each external sluice-valve. The internal stop-valve shall be such that it remains rigidly locked to the shell and in the closed position if the pipe is wrenched off.

216 301 The connexions to the external pipe-outlets of tank-containers shall be coated with a suitable plastics material.

216 302 The shells of tank-containers intended for the carriage of liquid organic peroxides of marginal 2701, 10°, 14°, and 15°, shall be equipped with a venting device fitted with a flame-trap and followed in series by a safety valve opening automatically at a pressure of 1.8 to 2.2 kg/cm^2 (gauge pressure). The materials of which closures liable to come into contact with the liquid or its vapour are made shall not have a catalytic effect (spring-loaded safety valve made of aluminium-silicon alloy (silumin) or of V2A stainless steel or of a material of equivalent quality).

216 303 The shells of tank-containers intended for the carriage of liquid organic peroxides of marginal 2701, 10°, 14°, and 15°, shall be equipped with thermal insulation in accordance with the requirements of marginal 213 304 (1). The covering and uncovered part of the shell shall be painted white.

216 304-
216 399

Section 4. TYPE APPROVAL

216 400-
216 499 (No special requirements)

Section 5. TESTS

216 500 The shells of tank-containers intended for the carriage of hydrogen peroxide or of aqueous solutions of hydrogen peroxide, of marginal 2371, 1°, or of liquid organic peroxides of marginal 2701, 10°, 14° and 15°, shall be tested at a pressure of 4 kg/cm² (gauge pressure).

216 501-
216 599

Section 6. MARKING

216 600-
216 699 (No special requirements)

Section 7. OPERATION

216 700 The inside of the shell of the tank-container, and all metal parts liable to come into contact with hydrogen peroxide of marginal 2371, 1°, shall be kept clean. No lubricant capable of combining dangerously with the substance carried shall be used for pumps, valves or other devices.

216 701 The shells of tank-containers intended for the carriage of liquids of marginal 2371, 1° to 3°, shall be filled to not more than 95 per cent of their capacity at a reference temperature of 15°C. The shells of tank-containers intended for the carriage of liquid organic peroxides of marginal 2701, 10°, 14° and 15°, shall be filled to not more than 80 per cent of their capacity. Shells shall be free from impurities at the time of filling.

216 702-
216 799

Section 8. TRANSITIONAL MEASURES

216 800-
217 099

CLASS IVa

TOXIC SUBSTANCES

Section 1. GENERAL; SCOPE; DEFINITIONS

217 100-
217 199

Section 2. CONSTRUCTION

217 200 The shells of tank-containers intended for the carriage of substances of marginal 2401, 2°(a), 3°, 4°(a), 11°(a), 13°(b), 14°, 23°, 61°(a), 61°(c), 61°(f), 81° and 82°, shall if these substances are liquid at +40°C (except carbon tetrachloride, chloroform and methylene chloride) be designed for a calculated pressure of 10 kg/cm² (gauge pressure).

217 201 The shells of tank-containers intended for the carriage of substances referred to in marginal 41 121 (3) other than those enumerated in marginal 217 200 above shall be so constructed that they can be discharged at a pressure of not less than 3 kg/cm² (gauge pressure).

217 202-
217 299

Section 3. ITEMS OF EQUIPMENT

217 300 (1) All openings in the shells of tank-containers intended for the carriage of substances referred to in marginal 41 121 (3) shall be above the surface level of the liquid.

(2) No piping or pipe connexions shall pass through the walls of the shell below the surface level of the liquid. The openings shall be capable of being hermetically closed and the closure shall be capable of being protected by a lockable cap. In addition the shells of such tank-containers may be fitted with bursting discs mounted in series preceding

the safety valves. In such a case the arrangement of the bursting disc and the safety valve shall be to the satisfaction of the competent authority.

217 301-
217 399

Section 4. TYPE APPROVAL

217 400-
217 499 (No special requirements)

Section 5. TESTS

217 500 Tank-containers intended for the carriage of substances of marginal 2401, 2°(a), 3°, 4°(a), 11°(a), 13°(b), 14°, 23°, 61°(a), 61°(e), 61°(f), 81° and 82°, shall if these substances are liquid at +40°C be tested initially and periodically at a pressure of 4 kg/cm² (gauge pressure).

217 501-
217 599

Section 6. MARKING

217 600-
217 699 (No special requirements)

Section 7. OPERATION

217 700 The shells of tank-containers intended for the carriage of substances of marginal 2401, 2°(a), 2°(b), 4°(a), 11°(a), 12°(a), 13°(a), 13°(b) and 81° to 83°, shall be filled to not more than 93 per cent of their capacity.

217 701 The shells of tank-containers intended for the carriage of aqueous solutions of ethyleneimine (3°) and of substances of marginal 2401, 14°, shall be filled to not more than 95 per cent of their capacity.

217 702-
217 799

Section 8. TRANSITIONAL MEASURES

217 800-
218 099

CLASS V

CORROSIVE SUBSTANCES

Section 1. GENERAL; SCOPE; DEFINITIONS

218 100-
218 199

Section 2. CONSTRUCTION

218 200 The shells of tank-containers intended for the carriage of bromine (14°) shall be designed for a calculated pressure of 21 kg/cm² (gauge pressure). They shall be equipped with a protective lead lining not less than 5 mm thick.

218 201 The shells of tank-containers intended for the carriage of substances of 1°(a), 1°(b), 2°(a), 2°(b), 6°(a), 7°, 8°, 9°, 21°(a) and 23° shall be designed for a calculated pressure of 10 kg/cm² (gauge pressure).

218 202 The shells of tank-containers intended for the carriage of substances referred to in marginal 51 121 (2), other than those listed in marginals 218 200 and 218 201, shall be designed for a calculated pressure of 4 kg/cm² (gauge pressure) and shall be so constructed that they can be discharged at a pressure of not less than 3 kg/cm² (gauge pressure).

218 203 The shells of tank-containers intended for the carriage of aqueous solutions of hydrogen peroxide (41°) shall meet the requirements of marginal 216 200.

218 204-
218 299

Section 3. ITEMS OF EQUIPMENT

218 300 All openings in the shells of tank-containers intended for the carriage of hydrofluoric acid (6°) and bromine (14°) shall be above the surface level of the liquid. No piping or pipe connexions shall pass through the walls of the shell below the surface level of the liquid. The closures shall be capable of being effectively protected by a metal cap.

218 301 The shells of tank-containers intended for the carriage of stabilized sulphur trioxide (9°) shall be thermally insulated and be fitted with a heating device on the outside. Shells may be of the bottom-discharge type. In this case the shell-discharge system shall include two mutually independent shut-off devices, the first being a quick-closing internal, stop-valve of an approved type and the second a sluice-valve, mounted in series, one at each end of the discharge pipe. A blank flange or some other equally reliable device shall also be fitted to the outlet of each external sluice-valve.

218 302 The shells of tank-containers intended for the carriage of hypochlorite solutions (37°) and of aqueous solutions of hydrogen peroxide (41°) shall be so designed as to prevent the entry of foreign matter, the leakage of liquid, and the development of any dangerous excess pressure in the shell.

218 303-
218 399

Section 4. TYPE APPROVAL

218 400-
218 499 (No special requirements)

Section 5. TESTS

218 500 The shells of tank-containers intended for the carriage of substances referred to in marginal 51 121 (2) shall be tested initially and periodically at a pressure of 4 kg/cm² (gauge pressure).

218 501 The pressure test of tank-containers intended for the carriage of stabilized sulphur trioxide (9°) shall be repeated every two and one-half years.

218 502 The condition of the lead lining of the shells of tank-containers intended for the carriage of bromine (14°) shall be checked every year by an approved expert, who shall inspect the inside of the shell.

218 503-
218 599

Section 6. MARKING

218 600 In addition to the particulars prescribed in marginals 212 600 and 212 601, the following particulars shall be marked on tank-containers intended for the carriage of bromine (14°): the permissible maximum net load in kg, and the date (month and year) of the most recent internal inspection of the shell.

218 601-
218 699

Section 7. OPERATION

218 700 The shells of tank-containers intended for the carriage of sulphuric acid of (1°(c)) shall be filled to not more than 95 per cent, those of tank-containers intended for the carriage of stabilized sulphur trioxide (9°) to not more than 88 per cent, and those of tank-containers intended for the carriage of bromine (14°) to not less than 90 per cent and not more than 92 per cent, or to 2.86 kg per litre, of their capacity.

218 701-
218 799

Section 8. TRANSITIONAL MEASURES

218 800-
219 999"

Appendix B.2

220 002 (b) Under "(b) *Liquefied gases*", third line, delete "Anhydrous ammonia (5°)".

Authentic text of the amendments: French.
Registered ex officio *on 1 January 1974.*