[TRANSLATION — TRADUCTION]

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 annex B of the above-mentioned Agreement

The amendments were proposed by the Government of the United Kingdom of Great Britain and Northern Ireland and circulated by the Secretary-General on 19 May 1975. They came into force on 19 November 1975, in accordance with article 14(3) of the Agreement.

REINFORCED PLASTICS TANKS

Amendments to Annex B of ADR

Delete existing marginal 31 121 (3) and replace by:

"(3) The following substances may be carried in reinforced-plastics tanks conforming to the provisions of Appendix B.1c:

Crude petroleum and other crude oils; volatile products from the distillation of crude petroleum and of other crude oils (item 1° (*a*)).

Semi-heavy products from the distillation of petroleum and of other crude oils (item 3°).

Heating oils and diesel oils (item 4°)."

Insert a new marginal 31 416:

"31 416 *Precautions against electrostatic charges*

Before filling or emptying reinforced-plastics tanks with substances with a flash point of 55 °C or lower, measures shall be taken in order to establish a good electrical connexion from the vehicle chassis to earth."

Insert a new marginal 31 417:

"31 417 The filling rate for substances with a flash point of 55 °C or lower shall be limited so as to avoid the generation of unsafe electrostatic charges."

Insert a new marginal 210 007:

"210 007 No person shall enter a reinforced-plastics tank unless it has been completely emptied of its contents and certified to be gas-free."

APPENDIX B.1c

Marginal 219 402

(1) Delete the phrase

"In accordance with the provisions laid down in article 4, paragraph 3, of the directive,".

Add a new paragraph reading as follows:

"(3) The percentage of glass fibre must be within the limits prescribed in marginal 219 400 (2) and, in addition, must not deviate by more than 10 per cent of the figure for the prototype tank."

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[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, 905, 907, 920, 921, 922, 926, 940, 943, 951, 966, 973 and 982.

Add a new Section 5 reading as follows:

Section 5

Special provisions for tanks used for the carriage of substances with a flash point of 55 °C or lower

219 500 The tank must be constructed so as to ensure the elimination of static electricity from the various component parts so as to avoid the accumulation of dangerous electric charges.

219 501 All metal parts of the tank and the transport unit and also wall layers conducting electricity must be interconnected.

219 502 The resistance between each conducting part and the chassis must not be higher than 10^6 ohms.

Elimination of hazards due to charges generated by friction

219 503 The surface resistance and the discharge resistance to earth of the entire surface of the tank shall conform with the requirements of marginal 219 504.

219 504 The surface resistance and discharge resistance to earth measured in accordance with marginal 219 505 must satisfy the following requirements:

(1) Walls not equipped with electrically conducting elements:

(*a*) Surfaces upon which one can walk:

The discharge resistance to earth shall not be higher than 10^8 ohms.

(*b*) Other surfaces:

The surface resistance shall not be higher than 10^9 ohms.

(2) Walls equipped with electrically conducting elements:

(*a*) Surfaces on which one can walk:

The discharge resistance to earth shall not be higher than 10^8 ohms.

(*b*) Other surfaces:

Conductance shall be considered as sufficient if the maximum thickness of non-conducting layers on conducting elements, for example conducting sheets, metal netting or other appropriate material, connected to the earthing connexion, does not exceed 2 mm, and that in the case of a metal netting, the surface area of the mesh does not exceed 64 cm^2.

(3) Any measurement of surface resistance or discharge resistance to earth required to be carried out on the tank itself shall be repeated at intervals of not more than one year to ensure that the specified resistances are not exceeded.

219 505 *Test Methods*

1. Surface Resistance ($^R100$) — (insulating resistance) in ohms, electrodes of conducting paint in accordance with figure 3 of Recommendation IEC 167 of 1964, measured in the standard 23/50 atmosphere according to Recommendation ISO R291, paragraph 3.1, of 1963.

2. The discharge resistance to earth in ohms is the ratio between the direct voltage measured between an electrode described below in contact with the surface of the tank of the vehicle and the earthed chassis of the vehicle, and the total current.

The conditioning of the specimens is the same as in paragraph 1. The electrode is a disc with a surface area of 20 cm^2 and a diameter of 50 mm. Its close contact with the surface of the tank must be ensured, for example by using damp paper or a damp sponge or any other suitable substance. The earthed chassis of the vehicle is used as the other electrode. A direct voltage in the range of 100 volts-500 volts shall be applied. The measurement shall be carried out after the

test voltage has been applied for one minute. The electrode may be placed on any point of the internal or external surface of the tank.

If measuring is impossible on the tank, it may also be carried out, under the same conditions, in the laboratory, on a specimen of the material.

Elimination of hazards due to charges generated during filling

219 506 Metallic components bonded to earth shall be provided and so disposed that at any stage of the filling or emptying process there is an area of not less than 0.04 sq. metres of earthed metal in contact with the product per cubic metre of product contained in the tank at that instant, and that no part of the product shall be more than 2.0 metres from the nearest earthed metal component. Such metallic components may take the form of:

(*a*) A metal foot valve, pipe outlet, or plate provided the total area of metal in contact with the liquid is not less than that specified, or

(*b*) A metallic grill with wire thickness not less than 1 mm diameter and hole area not greater than 4 sq. centimetres, provided that the total area of the grill in contact with the liquid is not less than that specified.

219 507 Marginal 219 506 shall not apply to reinforced-plastics tanks equipped with any other system for eliminating the hazard from charges generated during filling, provided it has been demonstrated by a practical comparative test in accordance with marginal 219 508 that the relaxation time of the charge generated within the tank during filling is equivalent to that obtained for a metal tank of comparable dimensions.

219 508 *Comparative test*

(1) A comparative test of the electrostatic charge relaxation time in accordance with the conditions of test described in paragraph (2) shall be carried out on a prototype reinforced-plastics tank and steel tank in the following manner (see diagram 3).

(*a*) The reinforced-plastics tank shall be mounted in the same manner as it would be in use, for example, on a steel support simulating a vehicle chassis, and shall be filled to not less than 75 per cent capacity with automotive diesel fuel, a proportion of which is passed through a suitable microfilter in such a manner that the charge density of the total flow is approximately 100^{11} C/m^3.

(*b*) The field strength in the tank vapour space shall be measured by a suitable continuous reading field meter mounted with its axis vertical and placed at least 20 cm from the vertical fill pipe.

(*c*) A similar test shall be carried out on a steel tank whose width, length, breadth, and volume are within 15 per cent of those of the reinforced-plastics tank, or on a reinforced-plastics tank of similar dimensions, coated internally with metal foil connected to earth.

(2) The following conditions of test shall be met:

(*a*) The test shall be carried out in a covered area in conditions of relative humidity less than 80 per cent.

(*b*) The automotive diesel fuel used in the test shall have a rest conductivity at the temperature of measurement between 3 and 5 pS/m. This shall be measured in a cell in which

$$\frac{VT}{d^2} \text{ is less than or equal to } 2.5 \times 10^6$$

where V = applied voltage
d = spacing between electrodes in metres
T = duration of measurement in seconds

The rest conductivity measured on samples of the product taken from the test tank after filling shall not differ in successive tests on plastics and metal tanks by more than 0.5 p^S/m.

(*c*) Filling shall be at a constant rate within the range 1 to 2 m^3/min and shall be the same for the reinforced-plastics tank and for the steel tank. At the end of filling, the flow should be stopped in a time which is short compared with the relaxation time for the charge in the steel tank.

(*d*) The charge density shall be measured by a suitable continuously reading meter (for example, a field mill type) immersed in the product and placed as close as possible to the filling pipe.

(*e*) The supply pipes and the vertical filling pipe shall be of 10 cm internal diameter and shall terminate in a "T" type filling pipe outlet.

(*f*) A suitable microfilter,* with an adjustable by-pass enabling the proportion of flow passing through it to be regulated, shall be fitted not more than 5 m from the filling pipe outlet.

(*g*) The liquid level shall not reach the bottom of the filling pipe or the field meter.

Comparison of relaxation times

(3) The initial value of the field strength shall be that recorded at the earliest point of time after the cessation of flow of the fuel when a smooth decay curve has been established. The relaxation time in both tests shall be expressed as the time taken for the field strength to decay from the initial value to 0.37 of the initial value.

(4) The relaxation time of the reinforced-plastics tank shall not exceed that of the steel tank.

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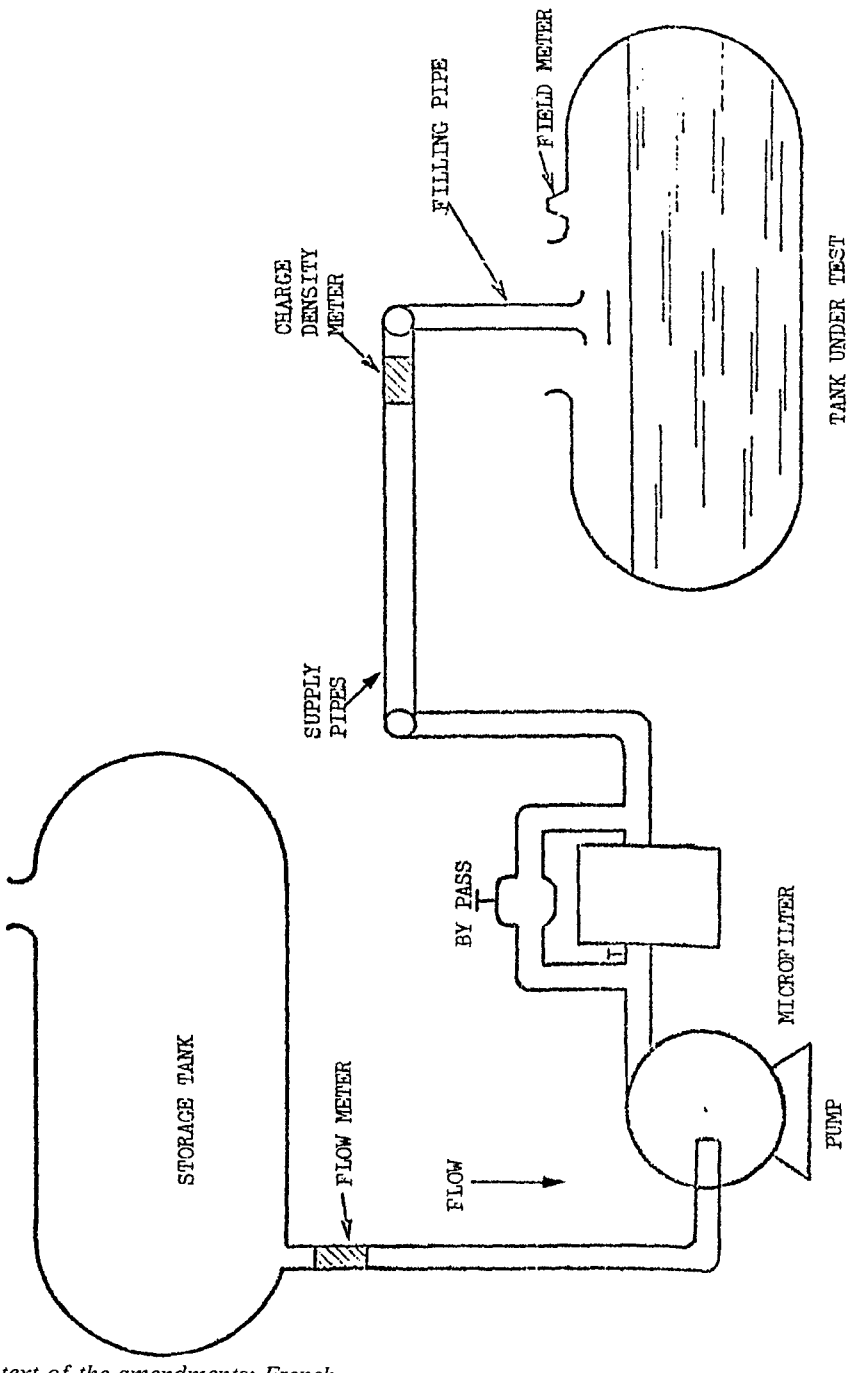
* A Rellumit 5 has been found to be suitable.

Diagram 3

SCHEMATIC LAYOUT OF RIG FOR COMPARATIVE TEST



Authentic text of the amendments: French.
Registered ex officio *on 19 November 1975.*