

Proposal for amendments to Regulation No. 34 (Fire risks)

The text reproduced below was prepared by the expert from the International Organization of Motor Vehicle Manufacturers (OICA) in order adapt the provisions of the regulation to the type of fuel for which the vehicle is designed. The modifications to the current text of the Regulation are marked in bold or strikethrough characters.

I. Proposal

"5.11 The fuel tank and its accessory parts shall be designed and installed in the vehicle in such a way that any ignition hazard due to static electricity shall be avoided.

If necessary, measure(s) for charge dissipation shall be provided. **However no charge dissipation system is required for vehicles using a fuel with a flash point higher than [55°C]. Determination of the flash point shall be in accordance with ISO 2719:2002.**

The manufacturer shall demonstrate to the technical service the measure(s) which guarantee(s) the fulfilling of these requirements."

Annex 1-Appendix 2, amend to read (the footnotes remain unchanged):

"COMMUNICATION

issued by :

Name of administration:



.....
.....
.....

concerning: 2/

- APPROVAL GRANTED
- APPROVAL EXTENDED
- APPROVAL REFUSED
- APPROVAL WITHDRAWN
- PRODUCTION DEFINITELY DISCONTINUED

of a fuel tank pursuant to Regulation No. 34.

Approval No.....

Extension No.:

- 1. Trade name
...
- 5. Brief description of fuel tank ~~and fuel~~ **and of the fuel feeding installation**
- 5.1. Characteristics of fuel **tank and fuel**:
- 5.2. For fuel tanks made of a plastic material, state material and trade name or mark:
.....
..."

II. Justification

Background

Paragraph 5.11. was last amended in 2004 (document ECE/TRANS/WP.29/GRSG/2003/7) at the eighty-fourth session of the Working Party on General Safety Provisions (GRSG). The purpose of this amendment was to take into account the potential danger showed in a few instances when fire began on some gasoline fuel propelled vehicles by sparks initiated by electrostatic charges. The wording included the expression "if necessary" in order to allow the approval authorities to request technical measures, depending on their assessment of the danger.

At that time, it was considered by the vehicle manufacturers that such wording would be of no consequence for the design of diesel fuel tanks, because statistical data do not report about any fire due to the electrostatic charging in diesel fuel tanks. Diesel fuel has a high Minimum Ignition Energy (spark point) which makes it safer than gasoline.

Unfortunately, it appears that there is a variety of interpretations among Approval Authorities regarding this provision. Some Authorities require the vehicle manufacturers to fit an electrical link between the tank and the chassis, even in the case of diesel fuel, whereas others consider there is no danger in such case and consequently do not require charge dissipation measure.

At the 99th session of GRSG in October 2010, the expert from the UK supported the objective but was of the opinion that the text shouldn't be design specific nor fuel related, rather be performance related. He then suggested to relate the performance requirement to the flash point. The experts from F and D revealed internal discussions: it was still not clear in the OICA proposal GRSG/2009/21 whether the tank addressed in paragraph 5.11. is the engine tank or any storage tank. D and F then requested OICA to take this concern into account in their next proposal.

This is the reason why the present proposal on the one hand clarifies that tanks for diesel fuel are not targeted by paragraph 5.11., and on the other hand permits the Technical Services to recognize for which fuel the tank under test is designed (improvement of the communication form).

Technical parameters (this part is unchanged compared to document GRSG-99-15)

To get an ignition of the gas mixture at the top of the filling pipe, three phenomena must be cumulated:

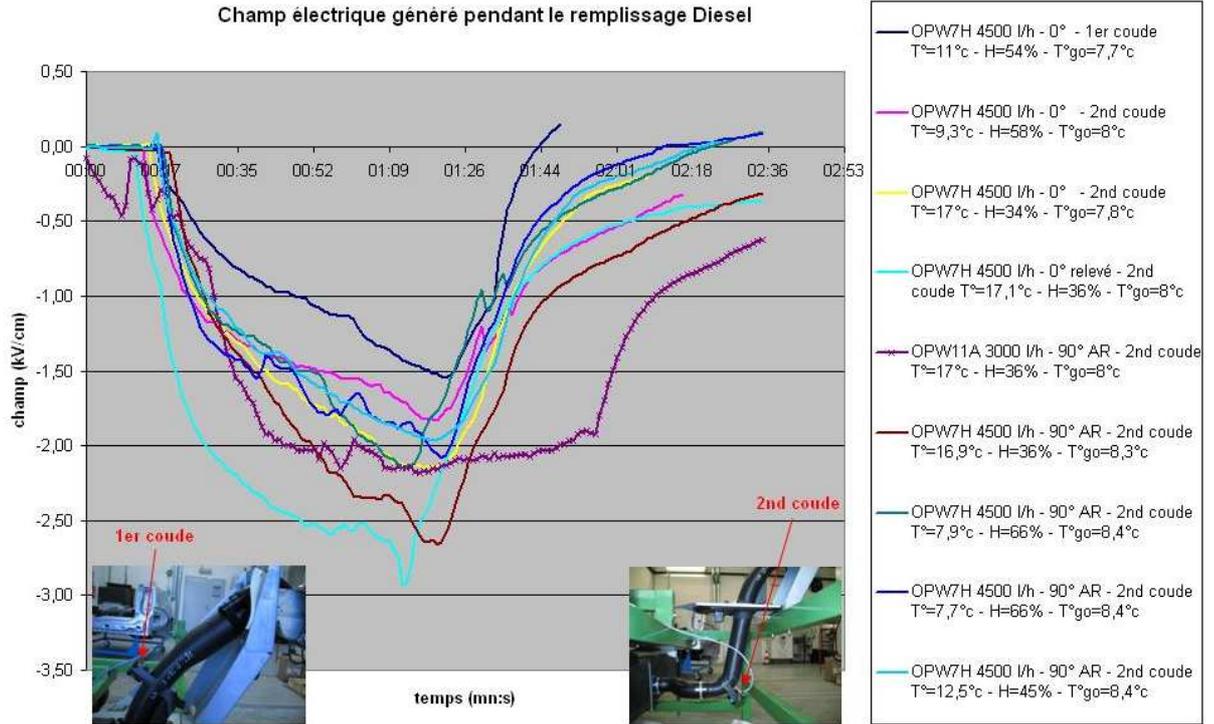
1. A **spark**, generated by sufficient induced energy and **electrostatic charge** above ca. 30kV/cm
2. Diesel vapors and air mixed in a rate in the vicinity of the **stoichiometric** conditions
3. **Temperature** of the vapors higher than 55°C (flash point of diesel fuel 10 ppm in Europe, see standard EN590_2002).

Two sources of danger are to be taken into account during the filling:

- A. Electrostatic charges generated by the circulation of the fluid in the gun of the filling station: while the level can reach the critical 30kV/cm, the flash point temperature of 55°C is almost never reached at the level of the pipe head, and the stoichiometric conditions is never cumulated to the electric charge and the temperature.
- B. Electrostatic charges generated by the friction of the fuel inside the pipe of the tank: the studies carried out to date (see below) show that this level reaches ca. 3 kV/cm, much lower than the threshold necessary to generate a spark (30kV/cm). In the case of heavy vehicles, the charge generated by the fluid circulation inside the tank pipe is dramatically reduced because the nozzle is directly fitted on the reservoir (no pipe).

Tests have been carried out with various flows of diesel fuel inside the pipe: 3000 l/h (maximum flow for light vehicles) and 4500 l/h (usual flow for heavy vehicles). The electrostatic charge was measured at the head of the filing pipe ("1^{er} coude") and at the inlet of the tank ("2nd coude"). The maximum electrostatic charge obtained is 3 kV/cm (10 times lower than the electrostatic load necessary to create a spark – see above).

Test : Electric field measured during the filling of the diesel



None of the conditions of inflammability stated above (1, 2 and 3) are reached by the sources of danger stipulated in A and B.

Conclusion of the technical parameters

The above demonstration provides evidence that no charge dissipation measure is to be required for vehicles using a fuel with a flash point higher than 55°C (diesel fuel).

Additional information

Lowest flash point values in other countries are :

Country	Minimum permitted diesel flash point (°C)	Signatory to 58 Agreement	Signatory to UNECE R34
India	35	No	-
South Korea	40	Yes	No
Canada	40	No	-
USA	38 (for N°1 Diesel only)	No	-
Japan	45	Yes	No

Identification of the fuel tank

As it is safe that the Approval Authorities be able to identify to which kind of fuel the tank is dedicated, the proposal above amends the communication form provided by the manufacturer to the Approval Authority in the sense that a description of the vehicle fuel feeding installation is now requested in the English version of the text, as an alignment on its French version. The type of this installation is indeed a fundamental parameter to discriminate which is the nature of the fuel propelling the vehicle.

The characteristics of the fuel tank remain requested in the communication form. However, the requirement of providing the characteristics of the fuel itself is now displaced from item 5. to item 5.1. This seems to be consistent as these data together will permit the Approval Authority to get full knowledge of the type of tank for which approval is requested, and to properly assess the necessity of e.g. a charge dissipation system.

OICA in addition finds opportune to add in paragraph 5.11 a reference to the relevant test method identifying the flash point of the fuel, per the Standard ISO 2719:2002 (Determination of flash point - Pensky-Martens closed cup method).
