



**Committee of Experts on the Transport of Dangerous Goods
and on the Globally Harmonized System of Classification
and Labelling of Chemicals****Sub-Committee of Experts on the Transport of Dangerous Goods****Forty-ninth session**

Geneva, 27 June – 6 July 2016

Item 5 (b) of the provisional agenda

Transport of gases: miscellaneous**Transport of gas tanks for motor vehicles****Submitted by the expert from Germany¹****Introduction**

1. At the forty-seventh session, the Sub-Committee considered document ST/SG/AC.10/C.3/2015/5 proposing a special provision on the transport of gas tanks for motor vehicles. The Sub-Committee welcomed the initiative but several comments were made on the details. To respond to these comments, informal document INF. 12 was submitted to the forty-eighth session. Though some experts did not see the need for such a provision, others supported the approach and the representatives of OICA and COSTHA underlined the importance of such provisions for the automotive industry. Provisions on the transport of gas tanks for motor vehicles had been inserted in RID/ADR/ADN and competent authority approvals have been issued in other parts of the world.

2. Usually, tanks to be fitted in vehicles are transported either empty or filled with inert gas at low pressure. However, there are some cases in which a transport of filled tanks is necessary, in particular if demounted tanks have to be transported for repair, disposal or recycling or to meet the needs of the production process.

3. When a tank is replaced at a repair shop, this shop usually does not have the equipment needed to empty the tank (completely). The demounted tank then has to be transported in a filled state for disposal or recycling. This may also be the case when a demounted tank is transported to an inspection site, e.g. in the case of a warranty claim.

¹ In accordance with the programme of work of the Sub-Committee for 2015–2016 approved by the Committee at its seventh session (see ST/SG/AC.10/C.3/92, paragraph 95 and ST/SG/AC.10/42, para. 15).

4 Moreover, for the simplification of the production process, there is also a need to transport new filled hydrogen tanks to the assembly facility. Usually, the tank is tested for leakage by means of an inert gas at the production facility and then transported further at low pressure. At the assembly facility, the tank then has to be flushed with hydrogen several times to ensure that the required mixing ratio in the fuel cell is achieved. The fuel cell is sensitive to contaminations of the fuel gas. If the tank was already tested for leakage with hydrogen or hydrogen mixtures, the effort required for eliminating the inert gas at the assembly facility would be considerably lower.

5. Vehicle tanks have to comply with the relevant standards and regulations for road vehicles. The referenced ECE Regulations and ISO standards for CNG and LPG tanks and the GTR provide a high level of safety (Annex of document ST/SG/AC.10/C.3/2015/5 shows selected test requirements). The tests were developed to demonstrate that the tank is capable of performing critical functions. These comprise functions related to the usage of a vehicle including fuelling/de-fuelling, parking in extreme conditions and performance in a fire. Manufacturers are expected to monitor the reliability, durability and residual strength of representative production units throughout the entire life of a vehicle. In the case of fire the gas will be released through a valve and no explosion will occur.

6. The status of application of the ECE Regulations and the global technical regulations and the possibility of referring to other national standards was discussed during the previous sessions. It became clear that different regulations and standards apply in different parts of the world, also ECE Regulations and GTRs have a limited territorial scope. The function of the references in this context is to describe the gas tanks and to ensure a sufficient level of safety, but a global application of the referenced regulation/standards is not required: E.g. gas tanks are manufactured in country A but will be installed in vehicles used in country B and thus have to comply with the technical standards applicable in country B. Consequentially, further national and European regulations have been incorporated in the proposal.

7. LNG tanks are not covered by the proposal. Requirements for LNG components have been incorporated into ECE R 110. However, the insulation of LNG tanks might not be sufficient to keep the necessary temperature level to prevent a discharge of overpressure through the venting system during longer transport. The minimum design hold time of vehicle LNG tanks is not more than 5 days. With regard to possible longer transport durations, in particular in sea transport, this seems not sufficient to ensure a safe transport in all modes of transport on the basis of the UN Model Regulations.

8. In this context also the discussion on dangerous goods in machinery, apparatus or articles, N.O.S should be taken into consideration. Without the insertion of new specialized provisions for gas tanks for vehicles, they might be consigned as dangerous goods in articles in future.

Proposal

9. Amend the Model Regulations as follows (changes from the previous version are underlined):

Chapter 3.2 Dangerous Goods List

For UN No 1011, 1049, 1075, 1954, 1965, 1969, 1971, 1978 add special provision xxx in column 6

Add the following special provision "xxx" to Chapter 3.3:

"xxx For the transport of fuel gas containment systems designed and approved to be fitted in motor vehicles containing this gas the provisions of sub-section 4.1.4.1, Chapter 5.2, Chapter 5.4 and Chapter 6.2 of these Regulations need not be applied when transported for disposal, recycling, repair, inspection, ~~or~~ 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 ECE Regulation No. 67 Revision 2² or ECE Regulation No. 115³ ~~in case of LPG tanks~~, ECE regulation No. 110 Revision 1⁴ or ECE Regulation No. 115⁵ or ISO 11439/ISO 15500⁶ or ANSI NGV 2⁷ or CSA B51 Part 2⁸ ~~in case of CNG tanks~~, the Global

² ECE Regulation No. 67 (Uniform provisions concerning: I. Approval of specific equipment of motor vehicles using liquefied petroleum gases in their propulsion systems; II. Approval of a vehicle fitted with specific equipment for the use of liquefied petroleum gases in its propulsion system with regard to the installation of such equipment)

³ 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)

⁴ ECE Regulation No. 110 (Uniform provisions concerning: I. Specific components of motor vehicles using compressed natural gas (CNG) in their propulsion system; II. Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) in their propulsion system)

⁵ 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)

⁶ ISO 11439:2013 Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles and ISO 15500 Road vehicles - Compressed natural gas (CNG) fuel systems

Part 1 to part 20

ISO 15500-1:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 1: General requirements and definitions

ISO 15500-2:2012 Road vehicles - Compressed natural gas (CNG) fuel system components - Part 2: Performance and general test methods

ISO 15500-3:2013 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 3: Check valve

ISO 15500-4:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 4: Manual valve

ISO 15500-5:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 5: Manual cylinder valve

ISO 15500-6:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 6: Automatic valve

ISO 15500-7:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 7: Gas injector

ISO 15500-8:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 8: Pressure indicator

ISO 15500-9:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 9: Pressure regulator

ISO 15500-10:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 10: Gas-flow adjuster

ISO 15500-11:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 11: Gas/air mixer

ISO 15500-12:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 12: Pressure relief valve (PRV)

ISO 15500-13:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 13: Pressure relief device (PRD)

ISO 15500-14:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 14: Excess flow valve

ISO 15500-15:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 15: Gas-tight housing and ventilation hose

ISO 15500-16:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 16: Rigid fuel line in stainless steel

ISO 15500-17:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 17: Flexible fuel line

ISO 15500-18:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 18: Filter

ISO 15500-19:2012 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 19: Fittings

Technical Regulation (GTR) No. 13⁹ or ISO/TS 15869/ISO 13985¹⁰ or Regulation (EC) No.79/2009¹¹ in combination with Regulation (EU) No. 406/2010¹² in case of hydrogen pressure tanks, as applicable.

(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 11623:2002 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 overfilled or if they exhibit damage that could affect their safety, they shall only be carried in salvaged pressure receptacles in conformity with these Regulations.

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

(d) Fuel gas containment systems shall be transported in such a way as to prevent obstruction of the pressure relief device or any damage to the valves and any other pressurised part of the fuel gas containment systems and unintentional release of the gas under normal conditions of transport. The fuel gas containment system shall be secured in order to prevent slipping, rolling or vertical movement.

(e) Fuel gas containment systems shall satisfy the provisions of 4.1.6.1.8 (a), (b), (c), (d) or (e).

(f) Fuel gas containment systems transported from where they are manufactured to ~~an~~ a vehicle assembly plant shall be filled with not more than 20 % of their nominal filling ratio or nominal working pressure, as applicable.

(g) The marking and labelling provisions of Chapter 5.2 shall be met unless fuel gas containment systems are consigned in a handling device. If this is the case then the markings and danger labels shall be affixed to the handling device.

(h) Documentation

ISO 15500-20:2015 Road vehicles -- Compressed natural gas (CNG) fuel system components -- Part 20: Rigid fuel line in material other than stainless steel

⁷ ANSI NGV 2-2007 - Compressed natural gas vehicle fuel containers

⁸ CSA B51 Boiler, pressure vessel, and pressure piping code Part 2 Requirements for high-pressure cylinders for on-board storage of fuels for automotive vehicles

⁹ Global technical regulation No. 13: Global technical regulation on hydrogen and fuel cell vehicles (ECE/TRANS/180/Add.13).

¹⁰ ISO/TS 15869:2009 Gaseous hydrogen and hydrogen blends - Land vehicle fuel tanks and ISO 13985:2006 Liquid hydrogen -- Land vehicle fuel tanks

¹¹ 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

¹² 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.

Every consignment that is transported in accordance with this special provision shall be accompanied by a transport document, containing at least the following information:

- (i) The UN number of the gas contained in the fuel gas containment systems, preceded by the letters “UN”;
 - (ii) The proper shipping name of the gas;
 - (i) The division number;
 - (iii) The number of fuel gas containment systems;
 - (iv) In the case of liquefied gases the total 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;
 - (v) The names and the addresses of the consignor and the consignee.
- (i) to (v) shall appear in accordance with the following examples:

Example 1: “UN 1971 natural gas, compressed, 2.1, 1 vehicle 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 vehicle fuel gas storage systems, each of 15 kg net mass of gas”.
