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Road vehicles — Liquefied natural gas (LNG) fuel system components —

Part 15: Capacitance fuel content gauge

*Véhicules routiers — Équipements pour véhicules utilisant le gaz naturel liquéfié (GNL) comme combustible —
Partie 15: Jauge de capacité*

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Foreword

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ISO 12614-15 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 25, *Vehicles using gaseous fuels*.

ISO 12614 consists of the following parts, under the general title *Road vehicles — Liquefied natural gas (LNG) fuel system components*:

- *Part 1: General requirements and definitions*
- *Part 2: Performance and general test methods*
- *Part 3: Check valve*
- *Part 4: Manual valve*
- *Part 5: Tank pressure gauge*
- *Part 6: Overpressure regulator*
- *Part 7: Pressure relief valve*
- *Part 8: Excess flow valve*
- *Part 9: Gas-tight housing and ventilation hose*
- *Part 10: Rigid fuel line in stainless steel*
- *Part 11: Fittings*
- *Part 12: Rigid fuel line in copper and its alloys*
- *Part 13: Pressure control regulator*
- *Part 14: Differential pressure fuel content gauge*

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Road vehicles — Liquefied natural gas (LNG) fuel system components — Part 15: Capacitance fuel content gauge

1 Scope

This part of ISO 12614 specifies tests and requirements for the capacitance fuel content gauge, a liquefied natural gas fuel system component intended for use on the types of motor vehicles defined in ISO 3833. This part of ISO 12614 is applicable to vehicles using natural gas in accordance with ISO 15403 (mono-fuel, bi-fuel or dual-fuel applications). It is not applicable to the following:

- a) fuel containers;
- b) stationary gas engines;
- c) container mounting hardware;
- d) electronic fuel management;
- e) refueling receptacles.

NOTE 1 It is recognized that miscellaneous components not specifically covered herein can be examined to meet the criteria of this part of ISO 12614 and tested according to the appropriate functional tests.

NOTE 2 All references to pressure in this part of ISO 12614 are to be considered gauge pressures unless otherwise specified.

NOTE 3 This part of ISO 12614 is based upon a working pressure for natural gas as a fuel of 1,6 MPa [16 bar¹⁾]. Other working pressures can be accommodated by adjusting the pressure by the appropriate factor (ratio). For example 2 MPa (20 bar) working pressure system will require pressures to be multiplied by 1,25

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 12614. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 12614 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3833, *Road vehicles — Types — Terms and definitions*.

ISO 12614-1, *Road vehicles — Liquefied natural gas (LNG) fuel system components — Part 1: General requirements and definitions*.

ISO 12614-2, *Road vehicles — Liquefied natural gas (LNG) fuel system components — Part 2: Performance*

1) 1bar=0,1MPa=105Pa; 1MPa=1N/mm²

and general test methods.

3 Terms and definitions

For the purposes of this part of ISO 12614, the terms and definitions given in ISO 12614-1 and the following apply.

3.1 Capacitance fuel content gauge

The assembly, covering the cables from the capacity sensor of the fuel tank, the capacity signal transmitter to standard electric signal, interconnecting cable and the dash-board fuel content indicator.

3.2 Capacitance transmitter

An instrument, which transmits the measured capacity between two cables into a standard electric signal.

3.3 Fuel content indicator

A gauge, which shows the fuel content on the dial or display as received as electric signal.

4 Marking

Marking of the capacitance transmitter shall provide sufficient information to allow the following to be traced:

- a) the manufacturer's or agent's name, trademark or symbol;
- b) the model designation (part number);
- c) temperature range.

The following additional markings are recommended:

- d) the direction of flow (when necessary for correct installation);
- e) the type of fuel;
- f) electrical ratings (if applicable);
- g) the symbol of the certification agency;
- h) the type approval number;
- i) the serial number or date code;
- j) reference to this part of ISO 12614.

NOTE This information can be provided by a suitable identification code on at least one part of the component when it consists of more than one part.

5 Construction and assembly

5.1 Assembly

The capacitance fuel content gauge consists of:

- capacitance transmitter (placed next to the fuel tank),
- fuel content indicator (placed on the dash-board)
(a standard automotive type gauge calibrated to the transmitter. Not subject of tests within this standard ISO 12614-17. It is presumed that the indicator is certified according the general automotive industry requirements.)
- capacity transmission cables
- signal transmission cable

5.2 The function of the fuel content gauge is measuring the electrical capacity between the fuel tank outer vessel and the cable from the inner vessel capacity level sensor. The function of the gauge is also transmission of the measured capacity to an electric signal to be sent to fuel content indicator (4 to 20 mA, e.g.).

5.3 The output of the capacitance fuel content gauge shall be joined with fuel content indicator on the dash-board. The gauge shall provide the signal compatible with the requirements of the fuel content indicator.

6 Test

6.1 Applicability

The tests required to be carried out on the capacitance transmitter are indicated in Table 1.

Table 1 — Tests applicable

Test	Applicable	Test procedure as required by ISO 12614-2	Specific test requirements of this part of ISO 12614
Hydrostatic strength			
Leakage			
Excess torque resistance	X	X	
Bending moment	X	X	
Continued operation			
Corrosion resistance	X	X	
Oxygen ageing	X	X	
Electrical overvoltages	X	X	
Non-metallic synthetic immersion			
Vibration resistance	X	X	
Brass material compatibility	X	X	