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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

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is 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 material other than stainless steel*

— *Part 13: Pressure control regulator*

— *Part 14: Differential pressure fuel content gauge*

— *Part 15: Capacitance fuel content gauge*

— *Part 16: Heat exchanger – vaporizer*

— *Part 17: Natural gas detector*

— *Part 18: Gas temperature sensor*

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 bar[1)]]. 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 documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 and general test methods*

3 Terms and definitions

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

1) 1 bar = 0,1 MPa = 105 Pa; 1 MPa = 1N/mm^2.

3.1
capacitance fuel content gauge
assembly, covering the cables from the capacity sensor of the fuel tank, the capacity signal transmitter to standard electric signal, interconnecting cables, and the dash-board fuel content indicator

3.2
capacitance transmitter
instrument which transmits the measured capacity between two cables into a standard electric signal

3.3
fuel content indicator
gauge which shows the fuel content on the dial or display as received as electric signal

4 Marking

Marking of the component 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.

a) the direction of flow (when necessary for correct installation);

b) the type of fuel;

c) electrical ratings (if applicable);

d) the symbol of the certification agency;

e) the type approval number;

f) the serial number or date code;

g) reference to this part of ISO 12614 (i.e. ISO 12614-15).

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 The capacitance fuel content gauge consists of

— capacitance transmitter (placed next to the fuel tank),

— fuel content indicator (placed on the dash-board),

NOTE 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 to the general automotive industry requirements.

— capacity transmission cables, and

— signal transmission cable.

5.2 The function of the fuel content gauge is to measure 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 to

transmit the measured capacity to an electric signal to be sent to the fuel content indicator, e.g. 4 mA to 20 mA.

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 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	
Insulation resistance	X		X (see 6.2)
Minimum opening voltage			

6.2 Insulation resistance

6.2.1 This test is designed to check for a potential failure of the insulation between the natural gas detectors connectors and the housing.

6.2.2 Apply 1 000 V d.c. between one of the connector pins and the housing of the natural gas detector for at least 2 s. The minimum allowable resistance shall be 240 kΩ.

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Price based on 3 pages