
**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

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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 41, *Specific aspects of gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 12614-15:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

- editorial changes.

A list of all parts in the ISO 12614 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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

Part 15: Capacitance fuel content gauge

1 Scope

This document 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 document is applicable to vehicles using natural gas in accordance with ISO 15403-1 (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) refuelling receptacles.

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

All references to pressure in this document are to be considered gauge pressures unless otherwise specified.

This document 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 ISO 12614-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

1) 1 bar = 0,1 MPa = 105 Pa; 1 MPa = 1N/mm².

— IEC Electropedia: available at <http://www.electropedia.org/>

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.

- i) the direction of flow (when necessary for correct installation);
- ii) the type of fuel;
- iii) electrical ratings (if applicable);
- iv) the symbol of the certification agency;
- v) the type approval number;
- vi) the serial number or date code;
- vii) reference to this document (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 The fuel content indicator is an automotive type gauge, calibrated to the transmitter, and therefore not subject of tests specified in this document. 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 capacitance 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 capacitance 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 dashboard. 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 document |
|----------------------------------|------------|---|---|
| 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) |

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 k Ω .

Bibliography

- [1] ISO 3833, *Road vehicles — Types — Terms and definitions*
- [2] ISO 15403-1, *Natural gas — Natural gas for use as a compressed fuel for vehicles — Part 1: Designation of the quality*

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