International Standard

ISO 19723-1

Road vehicles — Liquefied natural gas (LNG) fuel systems —

Part 1: Safety requirements

Véhicules routiers — Systèmes à carburant gaz naturel liquéfié (GNL) —

Partie 1: Exigences de sécurité

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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 document 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).

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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 for gaseous fuels*.

This second edition cancels and replaces the first edition (ISO 19723-1:2018), which has been technically revised. It also incorporates the Amendment ISO 19723-1:2018/Amd 1:2021.

The main changes are as follows:

— updated Clause 2, Normative references;

— added requirements for the electronic control unit (ECU);

— updated requirements for minimum receptacle clearance;

— added requirements for vent line closures.

A list of all parts in the ISO 19723 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.

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Introduction

All fuel system components in contact with liquid natural gas have been considered suitable for natural gas as defined in the ISO 15403 series.

A safety device to prevent overfilling the vehicle's fuel system is part of the refuelling station. The pressure gauge has not been considered as a safety component.

Technical solutions regarding functional requirements are given in Annex A.

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Road vehicles — Liquefied natural gas (LNG) fuel systems —

Part 1:
Safety requirements

1 Scope

This document specifies the minimum safety requirements applicable to liquefied natural gas (LNG) on-board fuel system intended for use on the types of motor vehicles defined in ISO 3833.

This document is applicable to vehicles (mono-fuel, bi-fuel or dual-fuel applications) using LNG according to the ISO 15403 series. It is applicable to original-production and converted vehicles.

All matters relating to the skills of installers and converters have been excluded from this document.

This document is only applicable to the components in the LNG system which is an assembly of components (tanks, valves, flexible fuel lines, etc., see Annex B) and connecting parts (fuel lines, fittings, etc.) fitted on motor vehicles using LNG in their propulsion system and related components up to and including the vaporizer. Other parts downstream from the vaporizer are considered as compressed natural gas (CNG) components covered by the ISO 15501 series.

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 7637-1, *Road vehicles — Electrical disturbances from conduction and coupling — Part 1: Vocabulary and general considerations*

ISO 7637-2, *Road vehicles — Electrical disturbances from conduction and coupling — Part 2: Electrical transient conduction along supply lines only*

ISO 11451-1, *Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 1: General principles and terminology*

ISO 11451-2, *Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 2: Off-vehicle radiation sources*

ISO 11451-4, *Road vehicles — Vehicle test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 4: Harness excitation methods*

ISO 11452-1, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 1: General principles and terminology*

ISO 11452-2, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 2: Absorber-lined shielded enclosure*

ISO 11452-3, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 3: Transverse electromagnetic (TEM) cell*

ISO 11452-4, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 4: Harness excitation methods*

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ISO 11452-5, *Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 5: Stripline*

ISO 12614 (all parts), *Road vehicles — Liquefied natural gas (LNG) fuel system components*

ISO 12617:2015, *Road vehicles — Liquefied natural gas (LNG) refuelling connector — 3,1 MPa connector*

ISO 12991, *Liquefied natural gas (LNG) — Tanks for on-board storage as a fuel for automotive vehicles*

ISO 15500 (all parts), *Road vehicles — Compressed natural gas (CNG) fuel system components*

ISO 19723-2, *Road vehicles — Liquefied natural gas (LNG) fuel systems — Test methods*

ISO 20653, *Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
liquefied natural gas
LNG
cryogenic liquid, produced by reducing the temperature of natural gas to about –162 °C at atmospheric pressure

3.2
pressure relief valve
device that prevents a pre-determined upstream pressure being exceeded

3.3
working pressure
maximum pressure to which a component is designed to be subjected to and which is the basis for determining the strength of the component under consideration

Note 1 to entry: For a *liquefied natural gas (LNG)* (3.1) tank, the primary relief valve setting prevents tank pressures from exceeding the tank's working pressure.

3.4
service pressure
intended settled pressure of the tank in use as declared by the manufacturer

3.5
check valve
automatic valve (3.11) which allows gas or liquid to flow in only one direction

3.6
fuel pump
device to establish the supply of *liquefied natural gas (LNG)* (3.1) to the engine by increasing the pressure of the fluid (liquid or vapour)

3.7
category M
<vehicle category> power-driven vehicles having at least four wheels and used for the carriage of passengers

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3.7.1
M1
<vehicle category> vehicles used for the carriage of passengers and comprising no more than eight seats in addition to the driver's seat

3.7.2
M2
<vehicle category> vehicles used for the carriage of passengers and comprising more than eight seats in addition to the driver's seat and having a maximum authorized mass not exceeding 5 000 kg

3.7.3
M3
<vehicle category> vehicles used for the carriage of passengers and comprising more than eight seats in addition to the driver's seat and having a maximum authorized mass exceeding 5 000 kg

3.8
category N
<vehicle category> power-driven vehicles having at least four wheels and used for the carriage of goods

3.8.1
N1
<vehicle category> vehicles used for the carriage of goods and having a maximum authorized mass not exceeding 3 500 kg

3.8.2
N2
<vehicle category> vehicles used for the carriage of goods and having a maximum authorized mass exceeding 3 500 kg but not exceeding 12 000 kg

3.8.3
N3
<vehicle category> vehicles used for the carriage of goods and having a maximum authorized mass exceeding 12 000 kg

3.9
protected position
area where components are installed to be protected against impact or collision

3.10
excess flow limiting device
device that automatically shuts off, or limits, the gas or liquid flow when the flow exceeds a certain defined criterion

3.11
automatic valve
valve or combination of valves that is/are not operated manually

Note 1 to entry: A manual valve is a valve which is operated manually.

3.12
gas-tight housing
device which vents gas leakage to outside the vehicle including the gas ventilation hose, the clear opening of which is at least 450 mm^2

3.13
electronic control unit
ECU
device which controls the *liquefied natural gas (LNG)* (3.1) demand of the engine and establishes the cut-off of the *automatic valve* (3.11) in case of a broken fuel supply pipe or in case of stalling of the engine, or during a crash

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