INTERNATIONAL STANDARD

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Second edition

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

Part 10: Rigid fuel line in stainless steel

Véhicules routiers — Équipements pour véhicules utilisant le gaz naturel liquéfié (GNL) comme combustible —
Partie 10: Tuyauterie rigide pour combustible en acier inoxydable

PROOF/ÉPREUVE

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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 12614-10:2014), 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 10: Rigid fuel line in stainless steel

1 Scope

This document specifies tests and requirements for the rigid fuel line, a liquefied natural gas fuel system component intended for use on the types of motor vehicles defined in ISO 3833. This document 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 bar[1)]). Other working pressures can be accommodated by adjusting the pressure by the appropriate factor (ratio). For example, a 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 1127, *Stainless steel tubes — Dimensions, tolerances and conventional masses per unit length*

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*

ASTM A269*Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service*

3 Terms and definitions

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

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

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

— IEC Electropedia: available at https://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) the working pressure or pressure and temperature range;

d) the serial number or date code.

The following additional markings are recommended:

i) the type of fuel;

ii) electrical ratings (if applicable);

iii) the symbol of the certification agency;

iv) the type approval number;

v) a reference to this document (i.e. ISO 12614-10).

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

The rigid fuel line shall comply with the applicable provisions of ISO 12614-1 and ISO 12614-2, and with the tests specified in Clause 6.

The stainless-steel rigid fuel line shall be a seamless cold-worked austenitic stainless-steel tube complying with ISO 1127 or ASTM A269.

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	X	X	X (see 6.2)
Leakage	X	X	
Excess torque resistance			
Bending moment			
Continued operation			
Corrosion resistance	X	X	

Table 1 *(continued)*

Test	Applicable	Test procedure as required by ISO 12614-2	Specific test requirements of this document
Oxygen ageing			
Electrical overvoltages			
Non-metallic material immersion			
Vibration resistance			
Brass material compatibility			
Bending	X		X (see 6.3)

6.2 Hydrostatic strength

The rigid fuel line shall be tested according to the procedure for testing hydrostatic strength specified in ISO 12614-2.

Test pressure shall be 4 times the working pressure.

NOTE The higher hydrostatic test pressure for the rigid fuel line than the other ISO 12614 series components is due to the necessary provisions to cope for eventual damage or abrasions under normal operation.

6.3 Bending

Test the rigid fuel line according to the following procedure and acceptance criterion.

a) Select a mandrel with a diameter according to Table 2.

b) Bend the rigid fuel line over this mandrel once, forming a “U” shape.

c) Close the rigid fuel line's ends and pressurize it to 4 times its working pressure. The rigid fuel line shall not leak.

Table 2 — Rigid fuel line external (RFLE) and mandrel diameters

RFLE diameter	Mandrel diameter
≤8 mm	3 × RFLE diameter
>8 mm	5 × RFLE diameter

Bibliography

[1] ISO 3833, *Road vehicles — Types — Terms and definitions*

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