INTERNATIONAL STANDARD

ISO 12614-7

Second edition
2021-06

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

Part 7: Pressure relief valve (PRV)

Véhicules routiers — Équipements pour véhicules utilisant le gaz naturel liquéfié (GNL) comme combustible —

Partie 7: Soupape de sécurité à la pression

Reference number
ISO 12614-7:2021(E)

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Published in Switzerland

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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 12614-7:2014), 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 7: Pressure relief valve (PRV)

1 Scope

This document specifies tests and requirements for the pressure relief valve (PRV), 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, 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 in ISO 12614-1 and the following 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 = 1 N/mm^2.

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

3.1
set pressure
pressure at which it is intended that the PRV opens

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.

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 12614-7).

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 PRV shall comply with the applicable provisions of ISO 12614-1 and ISO 12614-2 and with the tests specified in Clause 6.

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	X (see 6.3)
Excess torque resistance	X	X	
Bending moment	X	X	
Continued operation	X	X	X (see 6.4)
Corrosion resistance	X	X	
Oxygen ageing	X	X	

Table 1 *(continued)*

Test	Applicable	Test procedure as required by ISO 12614-2	Specific test requirements of this document
Electrical over voltages			
Non-metallic synthetic immersion	X	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	
Operational	X		X (see 6.5)

6.2 Hydrostatic strength

Test the PRV according to the procedure for testing hydrostatic strength specified in ISO 12614-2, at 2,5 times its working pressure, specified by its manufacturer.

For the purposes of this test, the PRVs mechanism shall be removed and its orifice blocked.

6.3 Leakage

Test the PRV at temperatures less than –162 °C and 85 °C (if required by the operating conditions) at working pressure.

6.4 Continued operation

The PRV shall be capable of withstanding 600 cycles of operation when tested according to the provisions of the continued operation test procedure given in ISO 12614-2 and the following.

a) A test cycle consists of, first, pressurizing the PRV to the set pressure. This action shall cause the PRV to open and vent. Once the valve is venting, reduce the inlet pressure. When the PRV re-seats, the cycle is finished.

b) After 600 cycles, test the PRV for leakage at 20 °C ± 5 °C at its working pressure. Cycle time shall be within a period of 10 s + 2 s.

6.5 Operational test

6.5.1 General

Verify the opening and re-seating pressures of the PRV.

6.5.2 Test procedure

Three randomly selected samples shall be subjected to the following test procedure. This test has three steps, which shall be conducted in the order given. Appropriate test media shall be chosen (i.e. air, nitrogen, or natural gas). If the test medium is not natural gas, then the calculated flow values shall be corrected for natural gas.

a) Establish the opening and re-seating values for the samples at 20 °C. Do this by first slowly pressurizing the inlet of the sample to 110 % of the set pressure, noting the value at which it first opens.

b) Lower the inlet pressure until the PRV re-seats; note that value. The valves are considered to have passed if all the following requirements are met:

   — opening pressures shall be ±5 % of the manufacturer's set pressure;

   — re-seating pressures shall be no less than 90 % of the manufacturer’s or measured set pressure;

— re-seating pressures shall be within ±5 % of the average re-seating pressure.

c) Repeat a) and b) at –162 °C and 85 °C or 120 °C as applicable. At each test temperature, the following criteria shall be met:

— opening pressures ±15 % of the manufacturer's set pressure;

— re-seating pressures no less than 80 % of the set pressure;

— re-seating pressures within +15 % of the average re-seating pressure.