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

Part 8: Excess flow valve

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

Partie 8: Valve de limitation de débit

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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 12614-8:2014), 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 8: Excess flow valve

1 Scope

This document specifies tests and requirements for the excess flow valve, 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 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 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 = 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/

3.1
internal excess flow valve
excess flow valve installed inside the cylinder or cylinder valve

3.2
external excess flow valve
excess flow valve installed outside the cylinder or cylinder valve

3.3
shut-off type excess flow valve
excess flow valve that stops flow when in the closed position

3.4
flow-limiter type excess flow valve
excess flow valve that limits flow when activated

Note 1 to entry: The device resets automatically when the excess flow condition is no longer present.

3.5
activation
differential pressure flow or other condition specified by the manufacturer at which the excess flow valve is activated

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 operating specifications (working pressure, temperature range, excess flow valve type, activation flow, or ΔP, maximum flow when activated);

d) the direction of flow (when necessary for correct installation).

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) the serial number or date code;

vi) a reference to this document (i.e. ISO 12614-8).

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 excess flow valve 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

There are many types of excess flow valves available. This document provides requirements for two different designs: internal and external excess flow valves. A valve of either design could be one of two different types: shut-off or flow-limiter. As excess flow valve designs vary, so will the tests required.

The function of an excess flow valve can be achieved in other ways. For example, instead of using a mechanical device, an electronic system can be adopted to ensure the closing or limiting of the gas flow from the cylinder in an accident.

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	X (see 6.4)
Bending moment	X	X	X (see 6.5)
Continued operation	X	X	X (see 6.6)
Corrosion resistance	X	X	
Oxygen ageing	X	X	
Electrical overvoltages			
Non-metallic synthetic immersion	X	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	
Operation	X		X (see 6.7)

6.2 Hydrostatic strength

Test the excess flow valve according to the procedure for testing hydrostatic strength specified in ISO 12614-2. For internal or external excess flow valves, the test pressure shall be 2,5 times the working pressure.

6.3 Leakage

The internal leakage test shall be conducted on shut-off type excess flow valves. The excess flow valve shall have an internal leakage rate less than 30 Ncm^3/h.

Test the excess flow valve at the temperatures and pressures given in Table 2.

Table 2 — Test temperatures and pressures

Temperature °C	First test pressure	Second test pressure
<–160	1,0 × working pressure	Operational pressure

Table 2 *(continued)*

Temperature °C	First test pressure	Second test pressure
20	Operational pressure	1,5 × working pressure
85	Operational pressure	

6.4 Excess torque resistance

The excess torque resistance test shall be conducted only on external excess flow valves. See ISO 12614-2.

6.5 Bending moment

The bending moment test shall be conducted only on external excess flow valves. See ISO 12614-2.

6.6 Continued operation

6.6.1 Cycle the excess flow valve 20 times at working pressure differential pressure. One cycle shall consist of one opening and one closing. Upon completion of the test, the valve shall comply with 6.3 and 6.7.

6.6.2 Following cycling, operation, and leakage retesting, perform the hydrostatic test in accordance with 6.2.

6.7 Operation

The manufacturer shall provide the flow and the minimum activation pressure of the component.

Perform the test using the activation conditions stated by the manufacturer; the measured flows and pressures shall meet the manufacturer's specified flow tolerance range. The flow test results shall be corrected to the standard conditions being at a temperature of 15 °C.