
**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).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 25, *Vehicles using gaseous fuels*.

ISO 12614 consists of the following parts, under the general title *Road vehicles — Liquefied natural gas (LNG) fuel system components*:

- *Part 1: General requirements and definitions*
- *Part 2: Performance and general test methods*
- *Part 3: Check valve*
- *Part 4: Manual valve*
- *Part 5: Tank pressure gauge*
- *Part 6: Pressure regulator*
- *Part 7: Pressure relief valve*
- *Part 8: Excess flow valve*
- *Part 9: Gas-tight housing and ventilation hose*
- *Part 10: Rigid fuel line in stainless steel*
- *Part 11: Fittings*
- *Part 12: Rigid fuel line in copper and its alloys*
- *Part 13: Pressure control regulator*
- *Part 14: Differential pressure fuel content gauge*
- *Part 15: Capacitance fuel content gauge*

- *Part 16: Heat exchanger – vaporizer*
- *Part 17: Natural gas detector*
- *Part 18: Gas temperature sensor*

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

Part 8: Excess flow valve

1 Scope

This part of ISO 12614 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 part of ISO 12614 is applicable to vehicles using natural gas in accordance with ISO 15403 (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) refueling receptacles.

NOTE 1 It is recognized that miscellaneous components not specifically covered herein can be examined to meet the criteria of this part of ISO 12614 and tested according to the appropriate functional tests.

NOTE 2 All references to pressure in this part of ISO 12614 are to be considered gauge pressures unless otherwise specified.

NOTE 3 This part of ISO 12614 is based upon a working pressure for natural gas as a fuel of 1,6 MPa (16 bar). (1 bar = 0,1 MPa = 105 Pa; 1 MPa = 1 N/mm².) 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

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 , max. flow when activated).

The following additional markings are recommended:

- a) the direction of flow (when necessary for correct installation);
- b) the type of fuel;
- c) electrical ratings (if applicable);
- d) the symbol of the certification agency;
- e) the type approval number;
- f) the serial number or date code;
- g) a reference to this part of ISO 12614 (i.e. ISO 12614-8:2014).

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 part of ISO 12614 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 part of ISO 12614
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	
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 Ncm³/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
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

Measure the activation flow or ΔP and the flow of the excess flow valve when it activates. Perform the test using the activation conditions stated by the manufacturer; the measured flows and pressures shall meet the manufacturer's specified flow.

Bibliography

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

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