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

Part 7: Pressure relief valve

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

Partie 7: Soupape de sécurité à la pression

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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.

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ISO 12617-7 was prepared by Technical Committee ISO/TC 22, *Road vehicle*, Subcommittee SC 25, *Vehicles using gaseous fuels*.

ISO 12617 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: Overpressure 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 7: Pressure relief valve (PRV)

1 Scope

This part of ISO 12614 specifies tests and requirements for the PRV, 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 bar¹⁾]. 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 normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 12614. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 12614 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 3833, *Road vehicles — Types — Terms and definitions*.

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*

1) $\text{bar}=0,1\text{MPa}=105\text{Pa}$; $1\text{MPa}=1\text{N/mm}^2$

and general test methods.

3 Terms and definitions

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

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:

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

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 of this part of ISO 12614.

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 part of ISO 12614
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)
Operational	X		X	X (see 6.5)
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	

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 the temperatures of less -160°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 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.
- After 600 cycles, test the PRV for leakage at $20^{\circ}\text{C} \pm 5^{\circ}\text{C}$ at its working pressure. Cycle time shall be within a period of 10s + 2s.