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Road vehicles — Liquefied petroleum gas (LPG) fuel systems components —

Part 12: Non-return valve

Véhicules routiers — Équipements pour véhicules utilisant le gaz de pétrole liquéfié (GPL) comme combustible —
Partie 12: clapet anti-retour

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Contents

Page

Foreword

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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 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 for gaseous fuels*.

A list of all parts in the ISO 20766 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 petroleum gas (LPG) fuel systems components —

Part 12: Non-return valve

1 Scope

This document specifies general information regarding the non-return valve component of liquefied petroleum gas fuel, intended for use on the types of motor vehicles as defined in ISO 3833. It provides general design principles and specifies requirements for instructions and marking. It also specifies test requirements for the non-return valve.

This document is applicable to vehicles (mono-fuel, bi-fuel or dual-fuel applications) using gaseous fuels in accordance with ISO 9162. 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.

NOTE 1 It is recognized that miscellaneous components not specifically addressed herein can be examined for compliance with the criteria of any applicable part of ISO 20766, including testing to the appropriate functional tests.

NOTE 2 All references to pressure in this document are considered gauge pressures unless otherwise specified.

NOTE 3 This document applies to devices which have a service pressure in the range of 110 kPa (Butane rich at 20 °C) and 840 kPa (Propane at 20 °C), hereinafter referred to in this document. Other service pressures can be accommodated by adjusting the pressure by the appropriate factor (ratio).

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 20766-1, *Road vehicles — Liquefied petroleum gas (LPG) fuel systems components — Part 1: General requirements and definitions*

ISO 20766-2:2018, *Road vehicles — Liquefied petroleum gas (LPG) fuel systems 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 20766-1 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

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

4 Markings

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 working pressure and temperature range.

The following additional markings are recommended:

— the direction of flow (when necessary for correct installation);

— the flow capacity

— the type of fuel;

— the electrical ratings (if applicable);

— the symbol of the certification agency;

— the type approval number;

— the serial number or date code;

— a reference to this document.

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 non-return valve shall comply with the applicable provisions of ISO 20766-1 and ISO 20766-2, and with the tests specified in Clause 6.

6 Tests

6.1 Applicability

The tests required to be carried out are indicated in Table 1.

Table 1 — Applicable tests

Test	Applicable	Test procedure as required by ISO 20766-2	Specific test requirements of this document
Hydrostatic strength	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)
[a] Only if applicable.			

Table 1 *(continued)*

Test	Applicable	Test procedure as required by ISO 20766-2	Specific test requirements of this document
Corrosion resistance	X[a]	X	
Vibration resistance	X[a]	X	
Brass material compatibility	X[a]	X	
Oxygen ageing	X	X	
Non-metallic material immersion	X	X	
Ozone ageing	X	X	
Creep	X[a]	X	
Resistance to dry heat	X	X	
Electrical overvoltage	X[a]	X[a]	
Insulation resistance	X[a]	X[a]	
Temperature cycle test	X	X	
Automotive fluids exposure	X	X	
Flow capacity	X		

[a] Only if applicable.

6.2 Hydrostatic strength

Test the non-return valve according to the procedure for testing hydrostatic strength specified in ISO 20766-2. The test pressure shall be 2,25 times the working pressure.

6.3 Leakage

Test the non-return valve for internal and external leakage at the temperatures and pressures given in Table 2.

Table 2 — Test temperatures and pressures

Temperature °C (±5 °C)	Pressure Factor × working pressure (WP)	
	First test	Second test
−40 or −20	1,25 × WP	0,025 × WP
20	0,025 × WP	2,25 × WP
85	0,05 × WP	

6.4 Continued operation

The non-return valve shall be able to withstand 50 000 cycles of operation and 24 h of chatter flow when tested according to the following procedure.

a) Connect the non-return valve to a test fixture and apply a pressure equal to the working pressure to the non-return valve's inlet, then vent pressure from its outlet. Lower the pressure on the non-return valve's outlet side to between 0 and a maximum of 0,5 times the working pressure prior to the next cycle.

b) Following 50 000 cycles of operation, subject the non-return valve to 24 h of chatter flow at a flow rate that causes the most chatter.

Failure in any sense during the procedure shall constitute a failure of the non-return valve. All parts shall remain in position and function properly after this test.

After this test, the non-return valve shall comply with the leakage test according to 6.3 and internal leakage according to ISO 20766-2:2018, 6.3.

Following this test, the non-return valve shall comply with the hydrostatic strength test according to 6.2.

Bibliography

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

[2] ISO 9162, *Petroleum products — Fuels (class F) — Liquefied petroleum gases — Specifications*