
**Road vehicles — Liquefied petroleum
gas (LPG) fuel system components —**

**Part 4:
Level indicator**

*Véhicules routiers — Équipements pour véhicules utilisant le gaz de
pétrole liquéfié (GPL) comme combustible —*

Partie 4: Indicateur de niveau

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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).

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For an explanation on 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 the following URL: 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 system components —

Part 4: Level indicator

1 Scope

This document specifies general requirements and definitions of liquefied petroleum gas fuel components, intended for use on the types of motor vehicles as defined in ISO 3833. It also provides general design principles, and specifies requirements for instructions and marking.

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 (all parts)¹⁾, *Road vehicles — Liquefied petroleum gas (LPG) fuel systems components*

IEC 60529:1989+A1:1999, *Degrees of protection provided by enclosures (IP Code)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20766-1 apply.

1) Under preparation.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

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); and
- 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 type of fuel;
- electrical ratings (if applicable);
- the symbol of the certification agency;
- the type approval number;
- the serial number or date code; and
- 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 Level indicator shall comply with the applicable provisions of ISO 20766-1 and ISO 20766-2, and with the tests specified in [Clause 6](#) of this document.

The electrical connections shall be of IP54 specifications according to IEC 60529-1989+A1:1999.

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	X (See 6.2)
Leakage	X	X	X (See 6.3)
Excess torque resistance	X	X	
X ^a Only applicable for Level indicators having electrical connections.			
X ^b Only applicable for Level indicators exposed to environmental conditions.			

Table 1 (continued)

Test	Applicable	Test procedure as required by ISO 20766-2	Specific test requirements of this document
Bending moment	X	X	
Continued operation	X	X	X (See 6.4)
Corrosion resistance	X ^b	X	
Electrical over-voltage	X ^a	X ^a	
Insulation resistance	X ^a		X (See 6.5)
Vibration resistance	X	X	
Brass material compatibility	X	X	
Oxygen ageing	X	X	
Non-metallic material immersion	X	X	
Ozone ageing	X	X	
Resistance to dry-heat	X	X	
Creep	X	X ^a	
Temperature cycle test	X	X ^a	
Float pressure test	X		X (See 6.6)
X ^a Only applicable for Level indicators having electrical connections.			
X ^b Only applicable for Level indicators exposed to environmental conditions.			

6.2 Hydrostatic strength

Test the level indicator 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 level indicator 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	0,75 × WP	0,025 × WP
20	0,025 × WP	2,25 × WP
85	0,05 × WP	

6.4 Continued operation

The level indicator shall be able to withstand 6 000 cycles of operation when tested according to the following procedure.

- Connect the level indicator in its normal position of work.
- Fill the tank/test setup till the 80 % tank valve is in its cut off position ($80\% \frac{0}{-5}$ of the tank volume).

- c) Register the reading of the level indicator.
- d) Cycle the 80 % tank valve for the 6 000 cycles between empty and its cut off position ($80\% \frac{0}{-5}$).
- e) Register the reading of the level indicator.

Failure in any sense during the procedure shall constitute a failure of the level indicator. All parts shall remain in position and function properly after this test. The reading on the level indicator before and after the 6 000 cycles should be in line with the manufacturers declared measurement tolerance.

Following this test, the level indicator shall comply with the hydrostatic strength test according to [6.2](#) of this document.

6.5 Insulation resistance

The insulation resistance test is designed to check for a potential failure of the insulation of the electrical connections.

Apply DC 1 000 V between one of the connector pins and the housing of the level indicator for at least 2 s. The minimum allowable resistance shall be 240 kΩ.

6.6 Float pressure test

If the level indicator of the container comprises a float, the latter shall withstand an outside pressure of 3 000 kPa.