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

**Part 21:**

**Pressure and/or temperature sensors**

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

*Partie 21: Capteurs de pression et/ou de température*

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Published in Switzerland

# Contents

|  | Page     |
|--|----------|
| Foreword.....                            | iv       |
| <b>1 Scope</b> .....                     | <b>1</b> |
| <b>2 Normative references</b> .....      | <b>1</b> |
| <b>3 Terms and definitions</b> .....     | <b>1</b> |
| <b>4 Markings</b> .....                  | <b>2</b> |
| <b>5 Construction and assembly</b> ..... | <b>2</b> |
| <b>6 Tests</b> .....                     | <b>2</b> |
| 6.1 Applicability.....                   | 2        |
| 6.2 Hydrostatic strength.....            | 3        |
| 6.3 High temperature.....                | 3        |
| 6.4 Low temperature.....                 | 3        |
| <b>Bibliography</b> .....                | <b>4</b> |

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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](http://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](http://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](http://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](http://www.iso.org/members.html).

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

## Part 21: Pressure and/or temperature sensors

### 1 Scope

This document specifies general requirements for the pressure and/or temperature sensors liquefied petroleum gas fuel, 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.

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

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

This document applies to device which have a service pressure in the range of 110 kPa (butane rich at 20 °C) and 840 kPa (propane rich 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, *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 terminology 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/>

## 4 Markings

The pressure and or temperature sensors shall bear, the following clearly legible and indelible identification markings consisting of characters, figures or symbols:

- a) the manufacturer's or agent's name, trademark or symbol;
- b) the model designation (part number);
- c) the working pressure and temperature range;
- d) the year and month of fabrication.

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;
- a reference to this document, i.e. ISO 20766-21.

## 5 Construction and assembly

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**5.1** The pressure and temperature sensor shall be designed to withstand the maximum operating pressure as applicable.

**5.2** The pressure and temperature sensor shall be designed to withstand a temperature between the minimum operating temperature and the maximum operating temperature as applicable.

**5.3** To prevent electric sparks on the surface, in case of fracture of the component, the electrically operated pressure and temperature sensor shall:

- a) be insulated in a manner that no current is conducted through LPG containing parts;
- b) have the electrical system of the device isolated from the body.

The isolation resistance shall be >10 MΩ.

**5.4** The pressure and temperature sensor materials constituting a device which are in contact with the heat exchange medium of a device when operating shall be compatible with that fluid and shall be designed to withstand a pressure of 200 kPa of the heat exchange medium.

## 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)                                 |
| External leakage   | X               | X   |   |
| High temperature   | X               |   | X (see 6.3)                                 |
| Low temperature  | X               |   | X (see 6.4)                                 |
| Non-metallic material immersion (LPG compatibility)  | X <sup>a</sup>  | X   |   |
| Corrosion resistance   | X <sup>a</sup>  | X   |   |
| Compatibility with heat exchange fluids of non-metallic parts  | X <sup>a</sup>  | X   |   |
| Resistance to dry heat   | X <sup>a*</sup> | X   |   |
| Ozone ageing   | X <sup>b</sup>  | X   |   |
| Creep  | X <sup>b</sup>  | X   |   |
| Temperature cycle  | X <sup>b</sup>  | X   |   |
| <sup>a</sup> Only if applicable.<br><sup>b</sup> Applicable for pressure and temperature sensors where working pressure is greater than 450 kPa. |                 |   |   |

## 6.2 Hydrostatic strength

Test the pressure and/or temperature sensors 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 High temperature

The pressure and/or temperature sensors shall not leak more than 15 cm<sup>3</sup>/h at normal conditions when subjected to the leakage test specified in ISO 20766-2 at the maximum operating temperature (65 °C or 85 °C or 120 °C as applicable) and pressure equal to 150 % of the working pressure. The component shall be conditioned for at least 8 h at this temperature.

## 6.4 Low temperature

The pressure and/or temperature sensors shall not leak more than 15 cm<sup>3</sup>/h at normal conditions when subjected to the leakage test specified in ISO 20766-2 at the minimum operating temperature (-40 °C or -20 °C as applicable) and pressure equal to 150 % of the working pressure. The component shall be conditioned for at least 8 h at this temperature.

## Bibliography

- [1] ISO 3833, *Road vehicles — Types — Terms and definitions*
- [2] ISO 9162, *Petroleum products — Fuels (class F) — Liquefied petroleum gases — Specifications*

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