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

**Part 1:
General requirements and definitions**

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

Partie 1: Exigences générales et définitions

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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 of 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 1: General requirements and definitions

1 Scope

This document specifies general requirements and definitions of liquefied petroleum gas fuel system 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; and
- 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 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 6722-1, *Road vehicles — 60 V and 600 V single-core cables — Part 1: Dimensions, test methods and requirements for copper conductor cables*

ISO 6722-2, *Road vehicles — 60 V and 600 V single-core cables — Part 2: Dimensions, test methods and requirements for aluminium conductor cables*

ISO 20766 (all parts)¹⁾, *Road vehicles — Liquefied petroleum gas (LPG) fuel systems components*

1) Under preparation.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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>

3.1 Valves

3.1.1

valve

device by which the flow of a fluid can be controlled

3.1.2

manual valve

valve which is operated manually

3.1.3

remotely controlled (automatic) valve

valve which is not operated manually and controlled by Electronic control unit (ECU)

3.1.4

remotely controlled (automatic) container valve

automatic valve rigidly fixed to the container which controls the flow of gas to the fuel system and controlled by ECU

3.1.5

non return valve or check valve

automatic valve which allows gas to flow in only one direction

3.1.6

excess flow valve

valve which automatically shuts off, or limits, the gas flow when the flow rate exceeds a set design value

3.1.7

manual container valve

manual valve rigidly fixed to the container

3.1.8

pressure relief valve

PRV

self-closing device which opens to prevent a pre-determined pressure being exceeded

3.1.9

service valve

manual valve which is closed only when servicing the vehicle

3.2 Fuels

3.2.1

liquefied petroleum gas vehicle

road vehicle powered by LPG

3.2.2**mono-fuel**

road vehicle which operates on liquefied petroleum gas only

Note 1 to entry: It is designed primarily for permanent running on LPG, but may still have a petrol system for emergency purposes.

Note 2 to entry: Also known as "Dedicated Liquefied petroleum gas Vehicle".

3.2.3**bi-fuel**

vehicle that has two independent fuel systems (one of them for LPG) and that can run alternatively on either fuel, but only on one at a time

Note 1 to entry: The simultaneous use of both fuels is limited in amount or duration.

3.2.4**dual-fuel**

vehicle that has two independent fuel systems (one of them for LPG) and can run on both fuels simultaneously

Note 1 to entry: It also may run on one fuel alone.

3.3 General**3.3.1****filter unit**

protective device which removes foreign debris or substances from the gas stream

3.3.2**fitting**

connector used in joining a piping, tubing, or hose system

3.3.3**hose**

non-metallic flexible tubing through which liquefied petroleum gas flows

3.3.4**gas mixing device**

device for mixing the gaseous fuel and intake air for the engine

3.3.5**gas dosage unit**

gas flow restricting device, installed downstream of a pressure regulator, controlling gas flow to the engine

3.3.6**gas tight housing**

device which vents gas leakage to outside the vehicle including the gas ventilation hose

3.3.7**level indicator**

device which indicates the LPG volume level in the container

3.3.8**pressure regulator**

device used to control the delivery pressure of gaseous fuel to the engine

3.3.9

pressure relief device

PRD

one time use device triggered by excessive temperature which vents gas to protect the container from rupture

3.3.10

rigid fuel line

gas tube

metallic tubing which has been designed not to flex in normal operation and through which liquefied petroleum gas flows

3.3.11

test pressure

pressure to which a component is taken during acceptance testing

3.3.12

working pressure

maximum pressure to which a component is designed to be subjected to and which is the basis for determining the strength of the component under consideration

3.3.13

burst pressure

pressure which causes failure and consequential fluid loss through the component envelope

3.3.14

injector

device for introducing gaseous fuel, as either a gas or liquid, into the engine or associated intake system

3.3.15

air

<dry> air with moisture content such that the dew point of the air at the required test pressure is at least 11 °C below the ambient test temperature.

3.3.16

hydrostatic pressure

pressure to which a component is taken to verify the structural strength of the component by means of an incompressible fluid

3.3.17

Liquefied Petroleum Gas

LPG

autogas

any product essentially composed of the following hydrocarbons: propane, propene (propylene), normal butane, isobutene, isobutylene, butane (butylene) and ethane

3.3.18

80 % container valve

device that limits the filling at maximum 80 % of the volumetric capacity of the container

3.3.19

remotely controlled service valve with excess flow valve

device which allows the establishment and interruption of LPG supply to the vaporizer/pressure regulator; remotely controlled means that the service valve is controlled by ECU with an integrated excess flow valve

3.3.20

vaporizer

device intended to vaporize LPG from a liquid to a gaseous state

3.3.21

fuel pump

device to establish the supply of liquid LPG from the container to the engine

3.3.22

shut-off valve

device to cut-off the flow of LPG

3.3.23

multivalve

device consisting of all or part of the accessories of the container

3.3.24

gas-tube relief valve

device to prevent the pressure from increasing above a pre-set value in an isolated section of the fuel delivery system

3.3.25

pressure and/or temperature sensor

device which measures pressure and/or temperature

3.3.26

service coupling

coupling in the fuel line between the fuel container and the engine that permits connection to an additional container

3.3.27

fuel rail

fuel system component, typically a pipe, tube or conduit, that delivers fuel to the fuel injection devices

3.3.28

power supply bushing

device which establishes an isolated and gas-tight electrical connection through the pressure boundary of the fuel container to provide power for the fuel pump, actuators and fuel level sensor

3.3.29

gas connections

connector used in joining a piping, tubing, or hose system

3.3.30

fuel selection system and electrical installations

device intended for selecting the fuel in case of a dual-fuel or bi-fuel systems

4 Construction and assembly

4.1 Components shall be made of materials suitable for use with LPG.

4.2 Jointing components shall provide gas tight sealing performance according to the requirements of the specific part of this document.

4.3 Threads for components attached to the container shall be clean cut, even, without surface discontinuities, to gauge and conform to International Standards applied to the LPG container threaded ports.

4.4 Components shall be suitable for service over one of the temperatures ranges indicated in [Table 1](#).

Table 1 — Temperature range for on-board components

	Engine Compartment	On-Board (except Engine Compartment)	Container accessories
Moderate	–20 to 120 °C	–20 to 85 °C	–20 to 65 °C
Cold	–40 to 120 °C	–40 to 85 °C	–40 to 65 °C

4.5 All non-metallic materials used in seals and diaphragms shall comply with the oxygen ageing test specified in ISO 20766-2.

4.6 All non-metallic materials in contact with liquefied petroleum gas shall comply with the non-metallic material immersion test specified in ISO 20766-2.

4.7 All components subject to weather exposure and other corrosive conditions shall be made of corrosion resistant material or otherwise protected, and comply with the corrosion resistance tests specified in ISO 20766-2 and subsequent applicable part of ISO 20766.

4.8 It is recognised that multifunctional components may be made up of several components as defined in ISO 20766-3 and subsequent applicable part of ISO 20766. Such components shall be examined for conformance to this document and tested according to the appropriate functional tests.

4.9 Automatic container valves shall be normally closed when not electrically energized. They shall be energized when the engine is running in LPG mode and when the ignition switch is in the running mode.

5 Electrical equipment and wiring

5.1 Any openings in electrical wiring components shall be equipped with means to prevent chafing and abrasion of the wire insulation.

5.2 Electrical equipment and circuit wiring in components shall comply with ISO 6722-1 and ISO 6722-2 with respect to mechanical strength, insulation and current carrying capacity.

5.3 Materials used for electrical construction shall be suitable for their particular application. Electrical insulating material shall provide the necessary mechanical strength, dielectric strength, and resistance to deformation by heat, to safely perform under the expected service and hazardous conditions.

6 Instructions

6.1 Clear, concise printed instructions and diagrams, stated in terms clearly understandable and adequate for proper assembly, installation, maintenance and safe operation, shall be made available by the manufacturer of the component and component package.

6.2 Instructions for periodic maintenance of components and identification of parts which require replacement, as required, shall be made available by the manufacturer of the component and component package.

6.3 Printed instructions shall state that the installation shall be in accordance with this document.

6.4 This information shall be in a form easily understood in the country of destination.

7 Marking

The components shall include the following information, permanently marked, as required in the relevant parts of this document:

- a) the manufacturer's or agent's name, trademark or symbol; and for non-metallic components also the manufacturing month and year; this marking shall be clearly legible and indelible;

NOTE Non-metallic components are intended as the approvable complete assemblies made by non-metallic materials (non-metallic spare parts, like gaskets and O-rings, are excluded from the marking requirements).

- b) the model designation (part number);
- c) the working pressure and temperature range;
- d) the direction of flow (when necessary for correct installation);
- e) the type of fuel;
- f) electrical ratings;
- g) the symbol of the certification agency;
- h) the type approval number;
- i) the serial number or date code;
- j) reference to the specific part of ISO 20766.

NOTE 1 Specific information required for each component can be found in ISO 20766-3 and subsequent parts of this document.

NOTE 2 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.