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

Part 16: Injectors and gas mixing device/fuel rail

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

Partie 16: Injecteurs et mélangeur de gaz / rampe de combustible

Reference number
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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 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 system components —

Part 16: Injectors and gas mixing device/fuel rail

1 Scope

This document specifies general requirements for the injectors and gas mixing device/fuel rail, components of 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 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 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

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; and

d) the direction of flow (when necessary for correct installation).

The following additional markings are recommended:

— 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; and

— 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 injectors and gas mixing device/fuel rail 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 (see 6.3)
Excess torque resistance	X	X	
Bending moment	X[a]	X	
Continued operation	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	X	
Vibration resistance	X	X	
Brass material compatibility	X	X	
Oxygen ageing	X	X	
Non-metallic material immersion	X	X	
Ozone ageing	X	X	
Creep	X	X	
Resistance to dry-heat	X	X	
Insulation resistance	X		X (see 6.5)
Minimum opening voltage	X		X (see 6.6)
[a] Only if applicable.			

6.2 Hydrostatic strength

Test the injectors and gas mixing device/fuel rail 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 injectors and gas mixing device/fuel rail at the temperatures and pressures given in Table 2.

Table 2 — Test temperatures and pressures

Temperature °C (±5 °C)	Pressure Factor × working pressure (WP) (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

Subject the gas injector or fuel rail assembly to 600 × 10^6 pulses at working pressure and room temperature. This procedure may be interrupted at 20 % intervals in order to check test criteria.

The minimum frequency for the pulses shall be 50 Hz.

Upon completion of this test, the gas injector or fuel rail assembly shall pass the leakage test in accordance with ISO 20766-2:2018, Clause 6, and the insulation resistance test given in 6.4.

6.5 Insulation resistance

This test is designed for checking the insulation resistance between the connector pin and the housing.

Apply a test voltage of 500 V d.c. for a duration of 60 s; for injectors with circuitry of 3,8 mm pitch or below, 100 V d.c. shall be used.

The minimum allowable resistance shall be >10 MΩ.

6.6 Minimum opening voltage

The minimum opening voltage at room temperature shall be ≤8 V for a 12 V system and ≤16 V for a 24 V system. The component shall be pressurized at 0,75 times the working pressure during the test.