
Road vehicles — Liquefied petroleum gas (LPG) refuelling connector

*Véhicules routiers — Connecteur de remplissage en gaz de pétrole
liquéfié (GPL)*

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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.

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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.

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Introduction

This document was developed for the design, examination, testing and certification of newly produced Liquefied Petroleum Gas Vehicle fuelling nozzles and receptacles only.

A nozzle compliant with this document is functionally compatible from a safety and performance perspective with all listed receptacles of compatible profile and system pressure. Similarly, a receptacle compliant with this document is functionally compatible from a safety and performance perspective with all listed nozzles of compatible profile and system pressure.

These standard profiles incorporate the design specifications (mating materials, geometry and tolerances) which can be considered in the certification of a submitted nozzle or receptacle.

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Road vehicles — Liquefied petroleum gas (LPG) refuelling connector

1 Scope

This document applies to Liquefied Petroleum Gas vehicle nozzles and receptacles, hereinafter referred to as devices, constructed entirely of new, unused parts and materials. Liquefied Petroleum Gas fuelling connectors consist of the following components, as applicable:

- a) nozzle (mounted on dispenser side) (see [Clause 5](#));
- b) receptacle (mounted on vehicle) (see [Clause 7](#)).

This document applies to devices which have a gauge service pressure in the range of 110 kPa (Butane rich at 20 °C) and 840 kPa (Propane at 20 °C), hereinafter referred to as [see [9.1 c](#)]:

- J15;
- K15.

This document also applies to:

- devices with standardized mating components;
- connectors which prevent Liquefied Petroleum Gas vehicles from being fuelled by other gaseous fuels station dispensers; and
- Liquefied Petroleum Gas in accordance with ISO 9162.

NOTE All references to pressures (kPa) throughout this document are considered gauge pressures unless otherwise specified.

This document does not apply to the fuel system of vehicle, with the exception of the Liquefied Petroleum Gas receptacle.

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 188, *Rubber vulcanized — Accelerated ageing or heat-resistance tests*

ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests*

ASTM D4814, *Standard Specification for Automotive Spark-Ignition Engine Fuel*

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:

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

3.1
dry air
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

3.2
working pressure
maximum pressure that a connector can be expected to withstand in actual service

3.3
Liquefied Petroleum Gas
LPG
autogas
low pressure gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases

3.4
nozzle
Liquefied Petroleum Gas refuelling nozzle
device which permits quick connection and disconnection of fuel supply hose to the *Liquefied Petroleum Gas receptacle* (3.5) in a safe manner

3.5
receptacle
Liquefied Petroleum Gas refuelling receptacle
device connected to a vehicle or storage system which receives the *Liquefied Petroleum Gas nozzle* (3.4) and permits safe transfer of fuel

3.6
connector
Liquefied Petroleum Gas refuelling connector
joined assembly of *Liquefied Petroleum Gas nozzle* (3.4) and *receptacle* (3.5)

3.7
non-sparking material
material that does not contain, by mass, more than 7,5 % in total of magnesium, titanium and zirconium
[SOURCE: IEC 60079-0:2017, 8.3]

3.8
service gasket
replaceable gasket ensuring tightness of the connection between the nozzle outlet and the receptacle inlet

3.9
cycle life
number of connections and disconnections between the *nozzle* (3.4) and the *receptacle* (3.5) required for testing purposes

3.10
service life
number of operations of the *receptacle* (3.5) required for testing purposes

4 General construction requirements

4.1 Nozzles and receptacles shall be designed in accordance with reasonable concepts of safety, durability and maintainability.

- 1) There are two different sizes of connectors, J15 and K15.

The profile of the two different sizes is so different that no cross connection between the sizes is possible.

- 2) Working pressure. All nozzles and receptacles are designed to have a working pressure defined by the manufacturer and clearly marked on the device [see 9.1 d)].
- 3) Design life. All nozzles shall be tested at 100 000 connect/disconnect cycles and all receptacles at 20 000 connect/disconnect cycles for compliance with this document. The service gasket may be changed at a minimum of 20 000 cycles.

4.2 Nozzles and receptacles shall be manufactured to the dimensional requirements of this document and in accordance with good engineering practice. All construction requirements can be met by either the construction specified in this document or another construction that gives at least equivalent performance.

4.3 Nozzles and receptacles shall be:

- designed to minimize the possibility of incorrect assembly;
- designed to be secure against displacement, distortion, warping or other damage under normal and anticipated abnormal conditions;
- designed to release less than 1 cm³ of liquid LPG during disconnection; and
- constructed to maintain operational integrity under normal and anticipated abnormal conditions of handling and usage;
- manufactured and produced according to a test plan as described in [Annex B](#).

4.4 Nozzles and receptacles shall be manufactured of materials suitable and compatible for use with Liquefied Petroleum Gas, in accordance with ISO 9162, at the pressure and the temperature ranges to which they will be subjected.

4.4.1 The temperature range shall be:

For the receptacle:

- Moderate operating conditions: –20 °C to +85 °C
- Cold operating conditions: –40 °C to +85 °C

For the nozzle:

- Moderate operating conditions: –20 °C to +65 °C
- Cold operating conditions: –40 °C to +65 °C

For specific regions, the temperature range specified may not be sufficient. In such a case, a wider temperature range, representative of that specific region, shall be considered.

4.5 Nozzles and receptacles shall be operated either to connect or disconnect without the use of tools and with one hand operation.

4.6 Jointing components shall provide gas-tight sealing performance.

5 Nozzles

The design of the nozzle shall ensure that:

- it is compatible with the relevant receptacle as specified in [Clause 6](#);
- entrapment of fingers and/or cold burns are not possible;
- the maximum push-on force during connection is 100 N at any pressure up to 1 500 kPa in the nozzle;
- the maximum pull-off force during disconnection is 50 N at 1 500 kPa;
- the force on the lever, if any, to open the valve applied at the centre of the grip area of the lever, is 100 N maximum at any pressure up to 1 500 kPa in the nozzle;
- where a latch is provided and in use, it shall be capable of being normally disarmed by the user;
- provision is made to enable the lever or the whole nozzle to freely rotate over an angle of 360° around the longitudinal axis of the nozzle or the filling hose; the requirement can be met by the integration of a swivel between nozzle and hose with provision of UL 567 requirements;
- it is not possible to open the valve in the nozzle if the nozzle is not properly locked and sealed on the receptacle;
- a locking mechanism is incorporated that locks in the connected position;
- it is not possible to unlock the nozzle from the receptacle unless the nozzle valve is closed;
- internal blocking due to freezing does not occur under intended operating conditions;
- it will withstand a torque of 150 % of the mounting torque specified by the manufacturer without damage;
- the external surfaces of the filling nozzle are corrosion resistant or protected against corrosion and are made of materials (non-sparking materials) that do not cause sparks when dropped on a surface;
- changing the service gasket shall not result in any Liquefied Petroleum Gas release;
- the minimum cycle life of the service gasket is 20 000 cycles;
- the nozzle is provided with a means to attach it to the delivery hose;
- the nozzle shall comply with the performance requirements of [Clause 10](#) to ensure interchangeability.

6 Standard receptacle dimensions J15 and K15

A receptacle shall comply with the design specifications detailed in [Figures 1](#) and [2](#).