



SLOVENSKI STANDARD

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**Oprema in pribor za utekočinjeni naftni plin (UNP) - Sestavni deli pogonov
motornih vozil na UNP - Sestavni deli, razen posod za gorivo**

LPG equipment and accessories - Automotive liquefied petroleum gas components -
Other than containers

Flüssiggas-Geräte und Ausrüstungsteile - Bauteile für Autogasanlagen/Treibgasanlagen
- Bauteile, ausgenommen Autogastanks

Équipements pour GPL et leurs accessoires - Composants pour véhicules au gaz de
pétrole liquéfié - Composants autres que le réservoir

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43.060.40	Sistemi za gorivo	Fuel systems
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**LPG equipment and accessories - Automotive liquefied
petroleum gas components - Other than containers**

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This European Standard was approved by CEN on 8 May 2022.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 12806:2022) has been prepared by Technical Committee CEN/TC 286 "LPG equipment and accessories", the secretariat of which is held by NSAI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12806:2003.

In comparison with the previous edition, the following technical modifications have been made:

- Revised definitions;
- Updated normative references;
- General reference to *maximum allowable pressure* rather than *design or test pressure*;
- Addition of a new component ("Manual shut-off container valve") and the relative subclause B.8;
- General revision of the Annexes.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

EN 12806:2022 (E)**Introduction**

Protection of the environment is a key political issue in Europe and elsewhere. For CEN/TC 286, this is covered in CEN/TS 16765 [7] and this Technical Specification should be read in conjunction with this document. The Technical Specification provides guidance on the environmental aspects to be considered regarding equipment and accessories produced for the LPG industry and the following is addressed:

- a) design;
- b) manufacture;
- c) packaging;
- d) use and operation; and
- e) disposal.

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1 Scope

This document specifies the general design and testing requirements for all components in automotive Liquefied Petroleum Gas (LPG) propulsion systems, which have a maximum allowable pressure equal to or greater than 20 kPa.

This document also specifies the requirements for the Electric Control Unit (ECU), which is not subjected to pressure, and the gas-tight housing which has a maximum allowable pressure below 20 kPa.

This document does not apply to containers.

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.

EN 549:2019, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 589, *Automotive fuels - LPG - Requirements and test methods*

EN 22768-1, *General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications (ISO 2768-1)*

EN 60529, *Degrees of protection provided by enclosures (IP code)*

EN IEC 60068-2-52, *Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)*

EN ISO 1307:2008, *Rubber and plastics hoses - Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses (ISO 1307:2006)*

EN ISO 1402, *Rubber and plastics hoses and hose assemblies - Hydrostatic testing (ISO 1402)*

EN ISO 4080, *Rubber and plastics hoses and hose assemblies - Determination of permeability to gas (ISO 4080)*

EN ISO 8031, *Rubber and plastics hoses and hose assemblies - Determination of electrical resistance and conductivity (ISO 8031)*

EN ISO 9227, *Corrosion tests in artificial atmospheres - Salt spray tests (ISO 9227)*

EN ISO 10619-2:2021, *Rubber and plastics hoses and tubing - Measurement of flexibility and stiffness - Part 2: Bending tests at sub-ambient temperatures (ISO 10619-2:2021)*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

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

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

ISO 1436, *Rubber hoses and hose assemblies — Wire-braid-reinforced hydraulic types for oil-based or water-based fluids — Specification*

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

ISO 6957, *Copper alloys — Ammonia test for stress corrosion resistance*

3 Terms, definitions and abbreviations

3.1 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 <https://www.electropedia.org/>

3.1.1

pressure

gauge pressure, unless otherwise stated

3.1.2

test pressure

pressure to which the component, or an assembly of components, is subjected during the test

3.1.3

maximum allowable pressure

maximum pressure for which the equipment is designed

Note 1 to entry: All pressures are gauge pressures, unless otherwise stated.

3.1.4

fusible plug

component protecting the pressure vessel from bursting by venting the LPG content at a pre-set temperature

3.1.5

automotive LPG-system

assembly of components enabling a vehicle to use automotive LPG in its propulsion system

Note 1 to entry: Requirements for each component are specified in their specific annexes (see Table 1 and Table 2).

3.1.6

container

pressure vessel used for the storage of automotive LPG

3.1.7

80 % stop valve

device that limits the filling of the container to 80 % of its water capacity and acts as a non-return valve

3.1.8

level indicator

device that indicates the liquid level in the container

3.1.9

float

device, which may be used in the 80 % stop valve and/or the level indicator, floating on the surface of the liquid to detect the liquid level in the container

3.1.10**pressure relief valve****PRV**

self-closing valve which automatically, without the assistance of any energy other than that of the vapour concerned, discharges vapour at a predetermined pressure, and operates with a pop action

Note 1 to entry: This is known as a "safety valve" in ADR.

3.1.11**remote-controlled service valve with excess flow valve**

device that allows or interrupts the LPG supply to the vaporizer/pressure regulator which is operated remotely and is combined with an excess flow valve

3.1.12**excess flow valve**

valve designed to close automatically, with a small residual flow, when the fluid flow passing through it exceeds a predetermined value, and to re-open when the pressure differential across the valve has been restored below a certain value

3.1.13**pressure relief device****PRD**

device protecting the container from bursting, when exposed to fire, by venting LPG at a pre-set temperature and/or pressure

3.1.14**fuel pump**

device that pumps liquid LPG to the engine fuel system

3.1.15**gas-tight housing**

device that vents any leak from components fitted to the container to the venting tube

Note 1 to entry: It also collects and ducts any leaks to the outside of the vehicle, where necessary through a connecting hose and a lead-through.

3.1.16**power supply bushing**

gas-tight electrical power conductor for components installed inside the container

3.1.17**non-return valve**

valve designed to close automatically to prevent reverse flow

3.1.18**multi-valve**

device, which combines the functions of two or more components specified in Annex B

EN 12806:2022 (E)**3.1.19****vaporizer****pressure regulator**

device that vaporizes LPG, reduces and/or regulates the outlet pressure to a pre-set value independent of variations of the inlet pressure and/or the flow rate

Note 1 to entry: The shut-off valve can be integrated in the vaporizer/regulator.

3.1.20**shut-off valve**

valve to provide a leak tight seal which is operated either manually or remotely

3.1.21**remote-controlled shut-off valve**

valve to provide a leak-tight seal which is remotely operated

3.1.22**manual shut-off container valve**

manually operated shut-off valve which is rigidly fixed to the container

3.1.23**LPG injectors**

device that supplies a controlled quantity of LPG to the engine

3.1.24**mixing unit**

device that controls the quantity of vaporized LPG to the engine

3.1.25**LPG dosage unit**

device that meters and/or distributes the LPG vapour to the engine

3.1.26**flexible hoses**

flexible ducts that convey LPG liquid or vapour at various pressures from one point to another

3.1.27**hydrostatic relief valve**

self-closing valve which automatically, without the assistance of any energy other than that of the fluid concerned, discharges fluid at a predetermined pressure

3.1.28**filter unit**

device that removes particulates from the LPG

Note 1 to entry: The filter can be integrated in other components.

3.1.29**pressure sensor**

device that measures and transmits the pressure

3.1.30**temperature sensor**

device that measures and transmits the temperature

3.1.31**service coupling**

connector in the fuel line between the container and the engine for emergency fuelling

Note 1 to entry: If a mono-fuel vehicle is out of fuel, the engine can be operated by means of a service container coupled to the service coupling.

3.1.32**Electronic Control Unit****ECU**

device that controls the LPG supply to the engine and the electrical power supply to the remote-controlled service valves

3.1.33**fuel rail**

pipe or flexible hose that supplies the fuel to the injection devices

3.1.34**filling unit**

device installed on the outside of the vehicle to receive the filling nozzle and enable the filling of the LPG container

3.1.35**gas tube**

tubing made of metallic material which has been designed not to flex in normal operation and through which LPG flows

3.1.36**interconnected LPG system**

LPG-system having hydraulic interconnections with the petrol or diesel fuelling system

3.1.37**multi-component**

component which incorporates two or more service functions and which meets the combined requirements of the individual functions

3.2 Abbreviations

For the purposes of this document, the following abbreviations apply.

CAN	Controller Area Network
EMC	Electromagnetic Compatibility
STP	Standard Temperature and Pressure [15,6 °C (288,7 K), 1,013 bar absolute (0,101 3 MPa absolute)]

4 Technical requirements

4.1 General

Components shall be designed for use with automotive LPG as specified in EN 589.

The specific requirements for design and testing are detailed in the annexes (see Table 1 and Table 2).

If a device combines two or more functions of separate components, the relevant requirements for each component shall apply.

Table 1 — Annexes dealing with components fitted in or on the container

Component	Annex	Clause
80 % stop valve	B	B.1
level indicator	B	B.2
float	B	B.3
pressure relief valve	B	B.4
remote-controlled service valve with excess flow valve	B	B.5
excess flow valve	B	B.6
pressure relief device (PRD)	B	B.7
manual shut-off container valve	B	B.8
fuel pump	C	
gas-tight housing	D	
power supply bushing	E	
non-return valve	F	
multi-valve	G	
NOTE A fuel pump, multi-valve, gas-tight housing, power supply bushing and a non-return valve can be fitted if required for proper operation of the automotive LPG-system.		

Table 2 — Annexes dealing with components not fitted in or on the container

Component	Annex
pressure regulator / vaporizer	H
shut-off valve	I
gas injection device or injector	J
gas mixing unit	J
gas dosage unit	K
flexible hoses and gas pipes	L
hydrostatic relief valve	M
LPG filter unit	N
pressure and/or temperature sensor	O
service coupling	P
electronic control unit (ECU)	Q
fuel rail	R
filling unit	S
gas tube(s)	T
multi-component	Annexes applicable to the single components

4.2 General design rules

4.2.1 Electrically operated devices containing LPG

Electrically operated devices containing LPG shall not produce sparks in the event of failure.

No current shall flow through LPG containing parts.

The electrical system shall be insulated from the body of the component and from the container.

The insulation resistance shall be greater than 10 MΩ.

The electrical enclosures of the LPG installation inside the boot and passenger compartment and in the LPG container shall comply with class IP 40 according to EN 60529.

All other electrical enclosures shall comply with class IP 54 in accordance with EN 60529.

NOTE See UN/ECE Regulation 10 [3] for electromagnetic compatibility aspects.

4.2.2 Remotely operated valves

Remotely operated valves (e.g. service valve, shut-off valves), shall fail safe and shall remain closed when no power is applied (“normally closed” type).

4.2.3 Heat exchanger materials

Materials shall be compatible with the heat exchange medium. The heat exchanger shall be designed to withstand a pressure of twice the maximum allowable pressure of the heat exchange medium.