



**SLOVENSKI STANDARD**  
**SIST EN 12979:2002**

**01-november-2002**

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Automotive LPG-systems - Installation requirements

Systeme für mit Flüssiggas betriebene (LPG) Fahrzeuge - Einbauvorschriften

Véhicules a Gaz de Pétrole Liquéfiés (GPL) - Exigences d'installation

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**Ta slovenski standard je istoveten z: EN 12979:2002**

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**ICS:**

43.060.40      Sistemi za gorivo      Fuel systems

**SIST EN 12979:2002**      **en**

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EUROPEAN STANDARD

EN 12979

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2002

ICS 43.060.40

English version

## Automotive LPG-systems - Installation requirements

Véhicules à Gaz de Pétrole Liquéfiés (GPL) - Exigences  
d'installationSysteme für mit Flüssiggas betriebene (LPG) Fahrzeuge -  
Einbauvorschriften

This European Standard was approved by CEN on 16 November 2001.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This European Standard has been prepared by Technical Committee CEN/TC 286 "Liquefied Petroleum Gas 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of an identical text or by endorsement, at the latest by July 2002, and conflicting national standards shall be withdrawn at the latest by July 2002.

Annexes A and F are informative.

Annexes B, C, D and E are normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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**EN 12979:2002 (E)****Introduction**

This European Standard specifies requirements for the installation of equipment for the use of Liquefied Petroleum Gas (LPG) in automotive propulsion systems.

This European Standard calls for the use of substances and procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

It has been assumed in the drafting of this European Standard that execution of its provisions is entrusted to appropriately qualified and experienced people.

**1 Scope**

This European Standard specifies the requirements for the installation of automotive LPG components that comply with prEN 12805 and prEN 12806.

These requirements are to ensure safe operation of such components.

This standard does not cover type approval of a LPG motor vehicle.

NOTE Type approval requirements are covered in UN/ECE Regulations and EU legislation.

**2 Normative references**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

ISO 630, *Structural steels - Plates, wide flats, bars, sections and profiles*.

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs*.

prEN 12805, *Automotive liquefied petroleum gas components - Tanks*.

prEN 12806, *Automotive liquefied petroleum gas components - Other than tanks*.

EN 60529, *Degrees of protection provided by enclosures (IP-code) (IEC 60529:1989)*.

**3 Terms and definitions**

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

**3.1  
test pressure**

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

**3.2****working pressure**

pressure under normal operating conditions

**3.3****Liquefied Petroleum Gas (LPG)**

mixture of light hydrocarbons, gaseous under normal atmospheric conditions which can be liquefied by increased pressure or decreased temperature, the main components are propane, propene, butane and butene isomers

**3.4****automotive LPG**

motor fuel according to EN 589

**3.5****container**

vessel used for the storage of automotive LPG

**3.6****80 % stop valve**

device that limits the filling of the container to 80 % of the water capacity

NOTE the 80% stop valve can be combined with the filling unit.

**3.7****level indicator**

device that shows the level of liquid in the container

**3.8****pressure relief valve**

device that limits the pressure build up in the container

**3.9****remote-controlled service valve**

device that allows or interrupts the LPG supply to the vaporizer/pressure regulator

**3.10****excess flow valve**

device that interrupts the flow of LPG in case of a complete pipe fracture or hose rupture

**3.11****gas-tight housing**

cover that protects the components fitted to the container and vents any leak to the venting tube

**3.12****power supply bushing**

gas-tight electrical power conductor

**3.13****non-return valve**

device that allows flow in one direction only

**3.14****pressure relief device (i.e. fusible plug)**

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

**3.15****filling unit**

device that allows the container to be filled with LPG and prevents flow in the reverse direction

NOTE The filling unit can be combined with the 80 % stop valve.

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**EN 12979:2002 (E)****3.16****venting tube**

duct that connects the gas-tight housing to the atmosphere by way of a flanged fitting (lead through) fitted to the chassis of the vehicle

**3.17****electronic control unit**

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

**3.18****fuel rail**

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

**3.19****vehicle connector**

device located at the outside of the vehicle used to refuel the vehicle

NOTE The vehicle connector can be combined with the filling unit and/or the 80% stop valve when the container is not installed inside the vehicle

**3.20****vehicle type**

vehicle or family of vehicles which have the following characteristics in common:

- the manufacturers type designation;
- the essential aspects of design and construction;
- chassis/floor-pan;
- installation of the LPG equipment.

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**3.21****type of automotive LPG-system**

LPG-system or family of LPG-systems which have the following characteristics in common:

- automotive LPG-system manufacturer;
- pressure regulator/vaporiser type and manufacturer;
- gas fuelling system type and manufacturer, i.e. induction mixer, injector device, vapour or liquid, single or multipoint injection system:
  - sensors;
  - container type and manufacturer;
  - container accessories type and manufacturer;
  - container frame;
  - ECU (Electronic Control Unit) type by the same manufacturer;
  - basic software as far as safety issues are concerned;
  - installation manual;
  - user manual.



## 4 Symbols and abbreviated terms

EMC	Electro-Magnetic Compatibility
$g$	acceleration due to gravity
PRV	Pressure Relief Valve
PRD	Pressure Relief Device

## 5 Installation requirements

### 5.1 General requirements

The installer of the LPG-system shall ensure that:

- he possesses the expertise necessary for the proper installation of the LPG-system,
- he has a quality control system that ensures that the installation of the LPG-system meets the requirements of this standard,
- he maintains records of the leak test and start up operations that are carried out after the installation,
- the LPG-system installed in the vehicle shall function in such a manner that the pressure for which it has been designed and approved cannot be exceeded,
- all components of the automotive LPG-system comply with prEN 12805 and prEN 12806 - additional equipment required for the effective operation of the engine, not covered by prEN 12805 and prEN 12806 are installed only in parts of the LPG-system where the pressure is less than 20 kPa,
- all parts of the system are securely fastened,
- the LPG-system has been tested and corrected for leaks,
- the LPG-system is installed so that it is adequately protected against damage due to moving vehicle components, collision, grit or to the loading or unloading of the vehicle or the shifting of those loads,
- all components are installed so that it is possible to inspect them and the relevant markings can be read. Excluding the container, no component of the LPG-system, including any protective material which form part of such components, shall project beyond the external surface of the vehicle, with the exception of the vehicle connector if this does not project more than 10 mm beyond the nominal line of the body panel. No component of the LPG-system, including its protective material if applicable, excluding the container, shall be installed below the lower edge of the vehicle. No component of the LPG-system shall be located within 100 mm of the exhaust or similar heat source, unless adequate shielding against heat is provided,
- the installation of the automotive LPG-system complies with the relevant electro-magnetic compatibility (EMC) requirements.

In case of a retrofit installation of the LPG-system, the manufacturer of the system shall supply installation instructions to the installer of the LPG-system.

### 5.2 Connections to LPG-system

No appliances shall be connected to the propulsion system other than those strictly required for the proper operation of the engine of the motor vehicle.

**EN 12979:2002 (E)**

Motor vehicles of categories M<sub>2</sub>, M<sub>3</sub>, N<sub>2</sub>, N<sub>3</sub> and M<sub>1</sub> (see annex A) having a maximum total mass of more than 3 500 kg fitted with a compartment heating system which is connected to the LPG-system shall be adequately protected against unintended gas escape and the operation of the LPG propulsion system shall not be affected.

Cooking appliances connected to the vapour phase of the container shall be adequately protected against unintended gas escape and the operation of the LPG propulsion system shall not be affected.

Heating and/or cooking system shall not be connected to the liquid phase of the container. The vapour take-off system shall be protected by a manual or remotely controlled shut-off valve incorporating an excess flow, fitted to the container.

If a mono fuel vehicle with a petrol limp home system is equipped with a service coupling in the LPG-system then this coupling shall be adequately protected by the installation of a non-return valve between the container and the service coupling and it shall be possible to only operate the engine via this coupling. Vehicles provided with a service coupling shall have a sign in the form of a sticker in accordance with annex E, near the service coupling.

**5.3 LPG identification mark for M<sub>2</sub> and M<sub>3</sub> category vehicles**

Category M<sub>2</sub> and M<sub>3</sub> vehicles shall be identified in accordance with annex D.

A sign in form of a sticker shall be attached to the front and rear of M<sub>2</sub> and M<sub>3</sub> category vehicles and on the outside of the doors on the left-hand side for the right hand drive vehicles and on the right-hand side for left hand drive vehicles.

**5.4 Changes to the vehicle structure**

If any change is made to the vehicle structure to facilitate the installation of the LPG-system, or if the container is fitted on the roof of the motor vehicle, then a written agreement, accompanied by a detailed drawing, shall be obtained from the manufacturer of the motor vehicle or his authorised representative.

**5.5 Container installation**

The container shall:

- not be installed in the engine compartment,
- be securely fastened to the motor vehicle,
- be installed in the correct position according to the container manufacturer instructions.

The container shall have permanent fixing points to secure it to the motor vehicle or the container shall be secured to the motor vehicle by a container frame and container straps. The container shall be installed so that there is no metal to metal contact, other than at permanent fixing points fitted by the container manufacturer.

When the vehicle is fully laden the container shall not be less than 200 mm above the road surface, unless the container is adequately protected at the front and the sides and no part of the container is located lower than this protective structure.

The container shall not be lower than the original load-bearing points of the vehicle which are part of the vehicle structure; the original ramp angles and ground clearance shall not be affected, see annex A.

The container shall be installed so that the following accelerations can be absorbed (without damage occurring) when the container is full:

- vehicles of categories M<sub>1</sub> and N<sub>1</sub>: 20 g in the direction of travel and 8 g horizontally at right angle to the direction of travel;
- vehicles of the categories M<sub>2</sub> and N<sub>2</sub>: 10 g in the direction of travel and 5 g horizontally at right angle to the direction of travel;

- vehicles of the categories M<sub>3</sub> and N<sub>3</sub>: 6,6 g in the direction of travel and 5 g horizontally at right angle to the direction of travel.

These conditions are met if the requirements of annex B are fulfilled.

The adequacy of the absorption of accelerations can be shown by practical testing or calculation if its equivalence can be demonstrated.

## 5.6 Installation of more than one container

If more than one container is connected to the fuel line to the engine, the containers shall be installed so that no hydrostatic pressure build-up can take place in the fuel line and the LPG can not flow from one container into another.

This can be achieved by installing a non-return valve downstream of the remote-controlled service valve on each container and a hydrostatic relief valve in the delivery tube, downstream of the non-return valves. An adequate filter system shall be placed upstream of the non-return valves to prevent fouling of the non-return valves. See Figure F.1.

**NOTE** A non-return valve and a hydrostatic relief valve is not required if the back-flow pressure of the remote-controlled service valve in the closed position exceeds 500 kPa. See Figure F.2.

In this case the power supply to the remote-controlled service valves shall be wired so that no more than the remote-controlled service valve on one container is open at any one time. The overlap time to allow switching from one container to another shall be limited to two minutes.

Each container shall be provided with its own 80 % stop valve.

## 5.7 Components on or in the container

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### 5.7.1 General requirements

The components on and in the container shall be installed under the responsibility of the holder of the bonfire test as described in prEN 12805.

The components on or in the container shall be tightened to the torque specified by the manufacturer.

### 5.7.2 Remote-controlled service valve with excess flow valve on the container

The remote-controlled service valve with excess flow valve shall be installed directly on the container, without any intervening fittings.

The remote-controlled service valve with excess flow valve shall be controlled so that it automatically closes when the engine stalls or when the ignition is turned off.

### 5.7.3 Pressure relief valve

The pressure relief valve shall be installed in or on the container without intermediate fittings so that it is connected to the vapour space and shall discharge to the atmosphere or via a gas tight housing, if fitted.

### 5.7.4 Filling unit

The filling unit shall be installed on the container.

### 5.7.5 80 % stop valve

The 80 % stop valve shall be specific to the type of container and shall be installed in the correct position using the torque specified by the manufacturer.