



SLOVENSKI STANDARD
SIST EN 589:1998

01-maj-1998

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Automotive fuels - LPG - Requirements and methods of test

Kraftstoffe für Kraftfahrzeuge - Flüssiggas - Mindestanforderungen und Prüfverfahren

Carburants pour automobiles - GPL - Exigences et méthodes d'essai

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ICS:

75.160.30 Plinska goriva Gaseous fuels

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EUROPEAN STANDARD

EN 589:1993

NORME EUROPÉENNE

EUROPÄISCHE NORM

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Descriptors: Motors vehicles, automotive fuels, liquefied petroleum gases, specifications, characteristics, tests, reference to standards

English version

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REPUBLIKA SLOVENIJA
MINISTRSTVO ZA ZNANOST IN TEHNOLOGIJO
Urad RS za standardizacijo in meroslovje
LJUBLJANA

SIST.....EN 589.....
PREVZET PO METODI RAZGLASITVE

-05- 1998

This European Standard was approved by CEN on 1993-03-16. 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 Central Secretariat or to any CEN member.

The European Standards exist 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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Foreword

This European Standard was drawn up by CEN/TC 19 "Test methods and specifications for petroleum products". The Standard was approved and in accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 September 1993, and conflicting national standards shall be withdrawn at the latest by September 1993.

This European Standard has been prepared under a Mandate given to CEN by the Commission of the European Communities and the European Free Trade Association.

Annex A and B are normative and form an integral part of this European Standard.

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1 Scope

This European Standard specifies requirements and methods of test for automotive LPG (Liquefied Petroleum Gases) as marketed and as delivered in the countries of the members of CEN. It is applicable to automotive LPG for use in vehicles fit to run on automotive LPG.

DANGER - Attention is drawn to the risk of fire and explosion when handling LPG and to the hazard to health which arises through inhalation of excessive amounts of LPG.

LPG is a highly volatile hydrocarbon liquid which is normally stored under pressure. If the pressure is released large volumes of gas will be produced which form flammable mixtures with air over the range 2 % V/V to 10 % V/V. This European Standard involves the sampling, handling and testing of LPG. All procedures should be conducted away from sources of ignition such as naked flames, unprotected electrical equipment and electrostatic hazards. Testing should be performed as far as practicable under an electrically-safe ventilation hood.

LPG in the liquid form can cause cold burns to the skin. Protective clothing such as gloves and goggles should be worn if contact with the skin is likely to occur.

Unnecessary inhalation of LPG vapour should be avoided. The operator should not be exposed to atmospheres containing more than 1 800 mg/m³ over an 8 h time-weighted average (TWA) reference period, or greater than 2 250 mg/m³ over a short term, 10 min reference period. One of the tests described in this European Standard involves the operator inhaling a mixture of air and LPG vapour. Particular attention is drawn to the cautionary statement provided in 6.2, where this method is referred to.

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.

EN	24260	¹⁾	Petroleum products and hydrocarbons - Determination of sulfur content - Wickbold combustion method.
ISO	4256	1978	Liquefied petroleum gases - Determination of vapour pressure - LPG method.
ISO	4257	1988	Liquefied petroleum gases - Method of sampling.

1) To be published. (CEN implementation of ISO 4260:1987, to replace EN 41:1975, Determination of the sulphur content of petroleum products by the Wickbold combustion method.)

ISO	4259	1979	Petroleum products - Determination and application of precision data in relation to methods of test.
ISO	6251	1982	Liquefied petroleum gases - Corrosiveness to copper - Copper strip test.
ISO	7941	1988	Commercial propane and butane - Analysis by gas chromatography.
ISO	8819	1987	Liquefied petroleum gases - Detection of hydrogen sulfide - Lead acetate method.
ISO	8973	2)	Liquefied petroleum gases - Calculation method for density and vapour pressure.
NF	M41-015	1988	Produits pétroliers. Détermination des résidus d'évaporation des gaz de pétrole liquéfiés.
ASTM D	2713	1986	Standard test method for dryness of propane (valve freeze method).

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3 Definition

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For the purposes of this European Standard, the following definition applies.

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3.1 **liquefied petroleum gases:** <https://standards.iteh.ai/catalog/standards/sist/41b41e8c-c35f-494f-bc4f-40c4b84b5488/sist-en-589-1998> Petroleum gases which can be stored and/or handled in the liquid phase under moderate conditions of pressure and at ambient temperature. These consist predominantly of propane, butanes, with small proportions of propene, butenes and pentanes/pentenes.

4 Sampling

Samples shall be taken as described in ISO 4257 and/or in accordance with the requirements of national standards or regulations for the sampling of automotive LPG. The national requirements shall be set out in detail or shall be referred to by reference in a national annex to this European Standard.

NOTE: It is important that the sampling procedure is followed in detail in order to avoid evaporation losses.

2) To be published.

5. Pump marking

Information to be marked on dispensing pumps used for delivering automotive LPG, and the dimensions of the mark shall be in accordance with the requirements of national standards or regulations for the marking of pumps for automotive LPG. Such requirements shall be set out in detail or shall be referred to by reference in a national annex to this European Standard.

6 Requirements and test methods

6.1 Water

Liquefied petroleum gases for automotive purposes shall not contain free water or suspended water on visual inspection. Additionally the content of dissolved water shall not be such as to cause failure when tested according to ASTM D 2713.

6.2 Odour

When tested in accordance with the procedure described in annex A, the odour of the gas shall be characteristic (i.e. distinctive and unpleasant) and detectable down to a concentration in air of 20 % of the lower flammability limit.

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Caution: In order to minimize the exposure of personnel conducting the odour test, it is strongly recommended that the test should only be performed when it has been ascertained that LPG already meets the other specification limits detailed in table 1 of this European Standard. The test involves the operator inhaling a mixture of LPG vapour and air. There is a risk that the short-term and/or long-term (8 h TWA reference period) occupational exposure limits for substances contained in the LPG may be exceeded. The operator should consult relevant safety and health regulations and ensure that exposure during the sampling, handling and testing of LPG does not exceed the prescribed limits.

As a guide, and provided the LPG being tested complies with the quality requirements listed in table 1 of this European Standard, an operator will normally remain within recommended occupational exposure limits provided inhalation of the LPG/air mixture does not exceed three 10 second periods during each test and not more than two tests per hour are performed in the course of an 8-hour working day. This guidance only takes account of the operator's exposure whilst conducting odour tests. Other potential exposures should be assessed in order to estimate total exposure.

6.3 Density

If information on density is required, the use of ISO 8973 is recommended.

6.4 General

When tested by the methods of test given in table 1, automotive LPG fuel shall comply with the limiting requirements specified in that table.

For the minimum vapour pressure four grades, A, B, C and D, are given to allow for seasonal limits to be set nationally for the winter period. In a national annex to this European Standard each country shall indicate which (winter) grade(s) it adopts and shall detail the date range applicable to each grade. For the summer period no minimum vapour pressure limit is specified.

Table 1: Requirements and test methods

Property	Units	Limits		Test method
		Min.	Max.	
Motor octane number (MON)		89		annex B
Dienes content (as 1,3-butadiene)	mole %		0,5	ISO 7941
Hydrogen sulfide		pass		ISO 8819
Total sulfur content (after stenching)	mg/kg		200	EN 24260
Copper strip corrosion (1 h at 40 °C)	rating	class 1		ISO 6251 ¹⁾
Evaporation residue	mg/kg		100	NF M 41-015
Vapour pressure, absolute at 40 °C	kPa		1550	ISO 4256
Vapour pressure, absolute: min. 250 kPa at a temperature of	°C			ISO 4256
- for grade A			-10	
- for grade B			- 5	
- for grade C			0	
- for grade D			+10	
1) This method may not accurately determine the presence of corrosive materials if the sample contains corrosion inhibitors or other chemicals which diminish the corrosivity of the sample to the copper strip. Therefore, the addition of such compounds for the sole purpose of biasing the test method is prohibited.				

6.5 Precision and dispute

All the test methods referred to in this European Standard include a precision statement. In cases of dispute, the procedures described in ISO 4259 for resolving the dispute, and interpretation of the results based on test method precision shall be used.

Annex A
(Normative)

Method of test for odour of LPG

A.1 Introduction

This annex describes a method for assessing the odour of commercial LPG which has either an odour due to the presence of unsaturated hydrocarbons or an odour imparted by the addition of odorants.

For precautionary statement, see 6.2.

A.2 Principle

The gas is vaporized and diluted with purified air so that the mixture contains the gas at a concentration of 20 % of the lower limit of its flammability¹⁾ in air. The odour of the gaseous mixture is assessed by at least three observers.

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A.3 Material

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Activated charcoal, particle size 1,18 mm to 1,70 mm, for purifying the air stream.

A.4 Apparatus

The apparatus is shown diagrammatically in figure A.1 and consists of the parts detailed in A.4.1 to A.4.5.

A.4.1 Air purifying column, consisting of a drying tower of approximately 200 ml capacity.

A.4.2 Flowmeter, such as one operating on the floating element principle, for air; range 5 l/min to 15 l/min.

A.4.3 Flowmeter, such as one operating on the floating element principle, for gas; range 5 ml/min to 150 ml/min.

A.4.4 Gas mixing bulb, 30 mm in diameter with a jet 4 mm in diameter.

A.4.5 Glass funnel, diameter 75 mm.

1) The lower limits of flammability in air may be taken as

butane	1,9 % V/V
propane	2,4 % V/V