SLOVENSKI STANDARD
SIST EN 589:2008+A1:2012

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Nadomešča:
SIST EN 589:2008

Goriva za motorna vozila - Utekočinjeni naftni plin (UNP) - Zahteve in preskusne metode

Automotive fuels - LPG - Requirements and test methods

Kraftstoffe für Kraftfahrzeuge - Flüssiggas - Anforderungen und Prüfverfahren

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

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75.160.20	Tekoča goriva	Liquid fuels

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Automotive fuels - LPG - Requirements and test methods

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Kraftstoffe für Kraftfahrzeuge - Flüssiggas - Anforderungen und Prüfverfahren

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Foreword

This document (EN 589:2008+A1:2012) has been prepared by Technical Committee CEN/TC 19 “Petroleum products, lubricants and related products”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

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

This document includes Amendment 1, approved by CEN on 2012-01-16.

This document supersedes [A1] EN 589:2008 [A1].

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] [A1].

Differences between this document and EN 589:2004 include:

— introduction of two new test methods for residues replacing the formerly applied EN ISO 13757 [1],

— introduction of a revised specification of residue content,

— introduction of a new test method for free water detection,

— update of the values in Table C.1 in terms of the number of digits.

Next, the Technical Corrigendum on the 2004 edition on Table B.1, as published in 2005, has been incorporated.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

1 Scope

This European Standard specifies requirements and test methods for marketed and delivered automotive LPG (Liquefied Petroleum Gas). It is applicable to automotive LPG for use in LPG engine vehicles designed to run on automotive LPG.

NOTE: For the purposes of this European Standard, the term "% (*V/V*)" is used to represent the volume fraction.

WARNING - 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 of approximately 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 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/m^3 over an 8 h time-weighted average (TWA) reference period, or more than 2 250 mg/m^3 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 A.1, where this method is referred to.

2 Normative references

The following referenced documents are indispensable for the application 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 15469:2007, *Petroleum products – Test method for free water in liquefied petroleum gas by visual inspection*

EN 15470:2007, *Liquefied petroleum gases – Determination of dissolved residues - High temperature Gas chromatographic method*

EN 15471:2007, *Liquefied petroleum gases – Determination of dissolved residues - High temperature gravimetric method*

EN ISO 4256:1998, *Liquefied petroleum gases - Determination of gauge vapour pressure - LPG method (ISO 4256:1996)*

EN ISO 4257:2001, *Liquefied petroleum gases - Method of sampling (ISO 4257:2001)*

EN ISO 4259:2006, *Petroleum products - Determination and application of precision data in relation to methods of test (ISO 4259:2006)*

EN ISO 6251:1998, *Liquefied petroleum gases - Corrosiveness to copper - Copper strip test (ISO 6251:1996)*

EN ISO 8819:1995, *Liquefied petroleum gases - Detection of hydrogen sulfide - Lead acetate method (ISO 8819:1993)*

EN ISO 8973:1999, *Liquefied petroleum gases - Calculation method for density and vapour pressure (ISO 8973:1997)*

〈A1〉 *deleted text* 〈A1〉

EN 27941:1993, *Commercial propane and butane - Analysis by gas chromatography (ISO 7941:1988)*

ASTM D 3246-05, *Standard test method for sulfur in petroleum gas by oxidative microcoulometry*

ASTM D 6667-04, *Standard test method for determination of total volatile sulfur in gaseous hydrocarbons and liquefied petroleum gases by ultraviolet fluorescence*

3 Terms and definitions

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

3.1
liquefied petroleum gas (LPG)
petroleum gas that can be stored and/or handled in the liquid phase under moderate conditions of pressure and at ambient temperature, consisting predominantly of propane, butanes, with small proportions of propene, butenes and pentanes/pentenes

4 Sampling

Samples shall be taken as described in EN 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.

In view of the sensitivity of some of the test methods referred to in this European Standard, particular attention shall be paid to compliance with any guidance on sampling containers which is included in the test method standard.

NOTE 1 It is important that the sampling procedure is followed in detail in order to avoid evaporation losses.

NOTE 2 Before sampling from the dispenser hose, 20 l of product should be pumped or recirculated, in order to obtain a representative sample.

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 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, five grades, A, B, C, D and E are given to allow for seasonal limits to be set nationally for each period of the year. In a national annex to this European Standard, each country shall indicate which grade(s) it adopts to achieve a minimum vapour pressure of 150 kPa (gauge) throughout the entire year and shall detail the date range in which the selected grade applies.

Table 1 — Requirements and test methods

Property	Unit	Limits		Test method [a] (See 2. Normative references)
		Minimum	Maximum	
Motor octane number, MON		89,0		Annex B
Total dienes content (including 1.3 butadiene)	mole %		0,5	EN 27941
Hydrogen sulphide		negative		EN ISO 8819
Total sulfur content [b] (after stenching)	mg/kg		50	[A1] *deleted text* [A1] ASTM D 3246 ASTM D 6667
Copper strip corrosion (1 h at 40 °C)	rating	class 1		EN ISO 6251
Evaporation residue	mg/kg		60	EN 15470 EN 15471
Vapour pressure, gauge, at 40 °C [c]	kPa		1 550	EN ISO 4256 EN ISO 8973 and Annex C
Vapour pressure, gauge, min. 150 kPa at a temperature of: [d, e]	°C			EN ISO 8973 and Annex C
- for grade A			- 10	
- for grade B			- 5	
- for grade C			0	
- for grade D			+ 10	
- for grade E			+ 20	
Water content [f]		Pass		EN 15469
Odour		Unpleasant and distinctive at 20 % LFL		See 6.3 and Annex A

[a] See also 6.5.1.
[b] See also 6.5.2.
[c] See also 6.5.3.
[d] For the purpose of this standard EN ISO 8973 together with Annex C shall be applied at the indicated temperatures. For internal routine quality control purposes, the values as given in the informative Annex D may also be used.
[e] See also 6.1.
[f] See also 6.2.

6.2 Water content

Liquefied petroleum gases for automotive purposes shall not contain free water at 0 ºC and at the saturated vapour pressure on visual inspection.

NOTE 1 For propane rich mixtures with a minimum of 60 % propane, compliance with EN ISO 13758 [1] equally satisfies this requirement.

For operational purposes it is allowed to add up to 2 000 mg/kg methanol. No other antifreeze agents shall be added.

6.3 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), detectable at a concentration in air of 20 % of the lower flammability limit.

NOTE Unpleasant being subjective, the odour should be a caution and inviting to the user to search for the leak.

6.4 Density

If a density report is required, EN ISO 3993 [3] or EN ISO 8973 are recommended.

6.5 Precision and dispute

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

6.5.2 In cases of dispute concerning the total sulfur content, ASTM D 6667 shall be used.

6.5.3 In cases of dispute concerning the vapour pressure, EN ISO 4256 shall be used.