Specificatie Tehnica De Livrare, SF-60 Ediţia 2/04.12.2017
GAZE PETROLIERE LICHEFIATE

Preambul
Acest standard de firma (SF-60) a fost elaborat ca urmare a adoptarii si implementarii de catre PETROTEL-LUKOIL a strategiei in domeniul standardizarii si in concordanta cu politica in domeniul calitatii.
Acest document inlocuieste specificatia tehnica de livrare STL 60 Ed.1/ 05.01.2017.
Comparativ cu ediţia anterioară a documentului s-au efectuat modificari editoriale si de structura.
În ceea ce priveşte conţinutul tehnic al acestui standard, menţionăm că nu există modificari.
Informatiile cu date de securitate pentru produsul "Gaze petroliere lichefiate" se gasesc in FDS versiunea 10, 09.06.2017.

1 Domeniu de aplicare

1.1 Prezentul standard de firma stabileste conditiile tehnice si metodele de incercare ale produsului "Gaze Petroliere Lichefiate" - combustibili gazoşi de origine petrolieră, aflaţi în stare lichefiată la presiune moderată şi temperatură ambiantă care se obţin prin fracţionarea gazelor şi sunt constituiţi, în principal, din amestecuri în care predomină fracţia C4 (alcani şi alchene), conţin fracţia C3 (alcani si alchene) si compuşi mai grei.
1.2 În funcţie de compoziţia chimică, gazele petroliere lichefiate se livrează în trei tipuri (I, II si III aragaz).
1.3 Produsul "Gaze petroliere lichefiate" se utilizează drept combustibil casnic şi industrial.

2 Referinte normative

Avand in vedere ca in prezentul standard sunt mentionate in text prevederi din alte referinte normative, pentru referintele nedatate se aplica ultima editie a documentului la care se face referire.

3 Esantionare

Eşantioanele trebuie prelevate conform prevederilor din EN ISO 4257.

4 Conditii si metode de incercare

4.1 Metodele de incercare sunt prezentate in tabelul 1
4.2. Verificarea calităţii
Verificarea calitatii produselor gazoase se efectueaza la vasul de depozitare. Livrarea se face pe baza de Declaratie de Conformitate.Declaraţia de Conformitate este documentul prin care se certifică calitatea fiecărui lot de produs.
Verificarea calităţii produsului "Gaze petroliere lichefiate" se face prin verificări de tip si verificări de lot.
4.2.1 Verificările de tip se efectuează la certificarea produsului.
Marimea unui lot se considera o cantitate definite din produs obtinuta in conditii presupus uniforme si caracterizat prin acelasi document de calitate.Se considera un lot de livrare cantitatea dintr-un vas de depozitare.
4.2.2 Verificările de lot:
La fiecare lot se verifică urmatoarele caracteristici de calitate: compoziţie chimică, miros, conţinut de sulf total, conţinut de hidrogen sulfurat, continut de apa, presiune de vapori absoluta, densitate produs lichid, densitate produs vaporizat si putere calorifică inferioară.La verificare, produsul trebuie să corespundă condiţiilor tehnice specificate in tabelul 1. În caz contrar, lotul se respinge şi pentru lotul respectiv nu se eliberează Declaraţia de Conformitate.

Tabel 1 Gaze petroliere lichefiate

Caracteristica	Unitate de masura	Limite						Metoda de incercare[a]
		TIP I		TIP II		TIP III		
Compoziţie chimică	% mol	min.	max.	min.	max.	min.	max.	ASTM D 2163 EN 27941
-hc.C_2 (saturate şi nesaturate)		-	4	-	1	-	-	
-hc.C_3 (saturate şi nesaturate)		35	45	-	50	-	12	
-hc.C_4 (saturate şi nesaturate)		55	65	50	-	86,5		
-total nesaturate		se raportează		-	-	-	-	
-hc.C_5 (saturate şi nesaturate)		-	1,5	-	1	-	1,5	
Miros		specific						Organoleptic SR 66 pct.7.1
Sulf total (după odorizare)	mg/m³	-	-	-	-	-	100	EN ISO 6326-3
Hidrogen sulfurat	mg / kg	-	0,5	-	0,5	-	-	ASTM D 2420 STAS11114 EN ISO 6326-3
Presiune de vapori calculata - la 10°C - la 20°C - la 45°C - la 50°C	kPa (bar)	- 100 (1) - -	- - 1600 (16) -	- 100 (1) - -	- - 1600 (16) -	170 (1,7) - - -	- - - 750 (7,5)	ASTM D 2598 EN ISO 8973 SR 66 anexa A EN ISO 4256
Densitate produs lichid la 15°C	kg/m³	-	-	-	-	se raporteaza		EN ISO 8973
Densitate produs gazos	kg/Nm³	-	-	-	-	2,550	-	SR 66
Putere calorifică inferioară	kJ/Nm³	-	-	-	-	112860 (27000)	-	SR 66
Apă		-	-	-	-	lipsă		SR 66

Nota:

[a] Toate metodele de incercare la care se face referire în prezentul SF conţin criterii de fidelitate. În caz de litigiu,trebuie sa fie aplicate procedurile descrise în EN ISO 4259 pentru rezolvarea lui şi pentru interpretarea rezultatelor bazate pe valorile de fidelitate ale metodei de incercare.

Exemplarul original cu semnaturi se afla la Manager Standardizare iar SF este pus la dispozitia clientilor prin Directia Livrari din cadrul Petrotel-Lukoil SA

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 589

December 2018

ICS 75.160.20

Supersedes EN 589:2008+A1:2012

English Version

Automotive fuels - LPG - Requirements and test methods

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

Kraftstoffe - Flüssiggas - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 19 October 2018.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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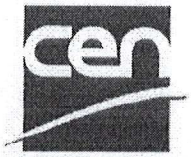

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 589:2018) has been prepared by Technical Committee CEN/TC 19 "Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin", 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 June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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 589:2008+A1:2012.

This is the 7th edition of EN 589. The main technical changes include:

a) reduction of the sulfur limit value to 30 mg/kg;

b) removal of ASTM D 3246, sulfur determination by oxidative microcoulometry, as being incapable of measuring that level;

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c) addition of single limit value for propane in Table 1;

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d) addition of a single limit value for 1,3 butadiene in Table 1 due to CLP requirements [5];

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e) introduction of a test method for the determination of 1,3 butadiene and hydrocarbon composition, for the determination of low sulfur levels in LPG (prEN 17178) and to determine evaporation residue (EN 16423);

f) addition of Clause 7 "Remarks concerning vehicle application issues like residues in vaporizers or injectors";

g) permission to use alternative odour tests added to sub-clause 6.3. The odour test according to Annex A is not a precise test method with any given precision. Odour is subjectively perceived, not measured. For this reason it is hard to define a referee method;

h) inclusion of reference to EN 16942 regarding pump marking in line with the requirements set by the new Directive 2014/94/EU [1].

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies requirements and test methods for marketed and delivered automotive liquefied petroleum gas (LPG), with LPG defined as low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN 1011, 1075, 1965, 1969 or 1978 only and which consists mainly of propane, propene, butane, butane isomers, butenes with traces of other hydrocarbon gases.

This standard 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 terms "% (*m/m*)" and "% (*V/V*)" are used to represent respectively the mass fraction, μ, and the volume fraction, φ.

WARNING — Attention is drawn to the risk of fire and explosion when handling LPG and to the hazard to health arising 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. Naked flames, unprotected electrical equipment electrostatic hazards etc. are sources of ignition for LPG.

LPG in liquid form can cause cold burns to the skin. The national health and safety regulations apply.

LPG is heavier than air and accumulates in cavities. There is a danger of suffocation when inhaling high concentrations of LPG.

CAUTION — 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.

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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 15469, *Petroleum products - Test method for free water in liquefied petroleum gas by visual inspection*

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

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

EN 16423, *Liquefied petroleum gases - Determination of dissolved residue - Gas chromatographic method using liquid, on-column injection*

EN 16942, *Fuels - Identification of vehicle compatibility - Graphical expression for consumer information*

prEN 17178:2017, *Automotive fuels — Sulfur content in liquefied petroleum gas — Determination by ultraviolet fluorescence (UVF)*

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

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

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

EN ISO 4259-2, *Petroleum and related products - Precision of measurement methods and results - Part 2: Interpretation and application of precision data in relation to methods of test (ISO 4259-2)*

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

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

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

DIN 51619, *Testing of mineral oil hydrocarbons — Determination of the composition of liquid petroleum gases — Gas chromatographic analysis under special consideration of 1,3-butadiene with mass fractions ≤ 0,1 % (m/m)*

ASTM D6667-14, *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.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

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

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3.1
liquefied petroleum gas
LPG

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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 and 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.

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

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 and nozzles used for delivering automotive LPG, and the dimensions of the label shall be in accordance with EN 16942.

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.

Liquefied petroleum gases for automotive purposes shall be free from any adulterant or contaminant that may render the fuel unacceptable for use in appropriate engines.

6.2 Water content

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

NOTE For propane rich mixtures with a minimum of 60 % (*m*/*m*) of propane, compliance with EN ISO 13758 [2] 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

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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.

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

For odour testing, alternative test methods may be used if this detection methods demonstrates the ability to measure the odour and/or a correlated parameter at least equal to that of the test method described in Annex A. Such alternative procedures shall be set out in detail or referred to by reference in a national annex to this European Standard.

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 4259-2, shall be used.

6.5.2 In case of dispute concerning the evaporation residue, EN 15470 or EN 15471 shall be used.

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

6.5.4 In case of dispute concerning the total diene content and the propane content EN 27941 shall be used.

6.5.5 In cases of dispute concerning total sulfur content, prEN 17178 shall be used. See paragraph 14.1 in that document for additional information on precision.

Table 1 — Requirements and test methods

Property	Unit	Limits		Test method[a] (See Clause 2, Normative references)
		Minimum	Maximum	
Motor octane number, MON		89,0		Annex B
Total dienes content [i]	% (*m*/*m*)		0,5	EN 27941 DIN 51619
1,3 Butadiene	% (*m*/*m*)		0,10	DIN 51619
Propane content [g,i] until 2022-04-30 from 2022-05-01	% (*m*/*m*)	 20 30		EN 27941 DIN 51619
Hydrogen sulphide		negative		EN ISO 8819
Total sulfur content (after odorization) [j]	mg/kg		30	prEN 17178 ASTM D6667
Copper strip corrosion (1 h at 40 °C)	rating	class 1		EN ISO 6251
Evaporation residue [b]	mg/kg		60	EN 15470 EN 15471 EN 16423
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 the a temperature of: [d,e]				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 [h]		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.

[g] A test method on MON and/or on the performance of LPG in the engine is under development. As soon as such a test method is available a revision with the aim of withdrawing the minimum propane content requirement will be initiated.

[h] National safety requirements have to be followed in any case and may overwrite this standard.

[i] See also 6.5.4.

[j] See also 6.5.5. ASTM D6667 is intended to be no longer referenced when sufficient data on EN 17178 is available.

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