

Automotive fuels — LPG — Requirements and test methods

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British Standard

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National foreword

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The UK participation in its preparation was entrusted to Technical Committee PTI/10, Liquefied petroleum gases, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

The principal differences between this edition of BS EN 589 and the 1999 edition are given in the European Standard foreword.

EN 589 requires that each country implementing it establishes national annexes detailing requirements for sampling, pump marking and winter grades. These requirements are given in national annexes NA, NB and NC respectively.

WARNING: Attention is drawn to the warning given in **annex A**. Attention is also drawn to the guidance notes associated with the Control of Substances Hazardous to Health Regulations 1994, such as the current version of Guidance Note EH 40, *Occupational exposure limits*, published by the Health and Safety executive (available from Her Majesty's Stationery Office).

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled "International Standards Correspondence Index", or by using the "Find" facility of the BSI Standards Electronic Catalogue.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 16, an inside back cover and a back cover.

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Carburant pour automobiles - GPL - Exigences et
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Kraftstoffe für Kraftfahrzeuge - Flüssiggas - Anforderungen
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This European Standard was approved by CEN on 17 April 2000.

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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 Central Secretariat has the same status as the official versions.

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 19, Petroleum products, lubricants and related products, the Secretariat of which is held by NNI.

This European Standard replaces EN 589:1998.

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 November 2000, and conflicting national standards shall be withdrawn at the latest by November 2000.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

In this third edition of EN 589 all relevant characteristics, requirements and test methods are specified. Significant technical changes between this European Standard and the previous edition are on:

- determination of water;
- requirement of sulfur content;
- test method for sulfur;
- test method for vapour pressure, including annex C;
- requirement for methanol;
- requirement for vapour pressure.

In this standard annex A, B and C are normative; annex D is informative.

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 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 more 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 A.1 of annex A, 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 (including amendments).

EN ISO 3993 *Liquefied petroleum gas and light hydrocarbons - Determination of density or relative density - Pressure hydrometer method* (ISO 3993:1984).

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

EN ISO 4257, *Liquefied petroleum gases - Method of sampling* (ISO 4257:1988).

EN ISO 4259, *Petroleum products - Determination and application of precision data in relation to methods of test* (ISO 4259:1992/Cor 1:1993).

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

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

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

EN ISO 13757, *Liquefied petroleum gases - Determination of oily residues - High-temperature method* (ISO 13757:1996).

EN 24260, *Petroleum products and hydrocarbons - Determination of sulfur content - Wickbold combustion method* (ISO 4260:1987).

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

ISO 8174, *Ethylene and propylene for industrial use - Determination of acetone, acetonitrile, propan-2-ol and methanol - Gas chromatographic method*.

ASTM D 3246-96, *Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry*.

3 Definition

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

3.1

liquefied petroleum gases

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/pentenenes

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.

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

NOTE 2 Before sampling for the determination of the evaporation residue, 20 l of product should be pumped in order to obtain a representative sample.