

Automotive fuels — Unleaded petrol — Requirements and test methods

The European Standard EN 228:2004 has the status of a
British Standard

ICS 75.160.20

National foreword

This British Standard is the UK implementation of EN 228:2004, incorporating corrigendum December 2005. It supersedes BS EN 228:2000, which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags **AC** **AC**. Text altered by CEN corrigendum December 2005 is indicated in the text by **AC1** **AC1**.

The UK participation in its preparation was entrusted to Technical Committee PTI/2, Liquid fuels.

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

EN 228 requires that each country implementing it establishes national annexes detailing requirements for “pump marking”, “RON” and “MON” requirements for regular grade, and seasonal volatility. Also, if the methods for sampling given in EN ISO 3170 or EN ISO 3171 are not to be used, a national annex has to detail the national requirements for sampling of unleaded petrol. National Annex NA of BS EN 228 gives additional requirements on sampling, in particular for sampling from the pump; National Annex NB gives details of requirements for pump marking; National Annex NC gives details of RON and MON requirements for regular grade; and National Annex ND gives details of seasonal volatility requirements.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 27 August 2004

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ISBN 978 0 580 59196 9

Amendments issued since publication

Amd. No.	Date	Comments
17166 Corrigendum No. 1	29 June 2007	See national foreword

English version

Automotive fuels - Unleaded petrol - Requirements and test methods

Carburants pour automobiles Essence sans plomb -
Exigences et méthodes d'essai

Kraftstoffe für Kraftfahrzeuge - Unverbleite Ottokraftstoffe -
Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 24 December 2003.

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.

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 document EN 228:2004 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 July 2004, and conflicting national standards shall be withdrawn at the latest by July 2004.

This document supersedes EN 228:1999.

Significant technical changes between this European Standard and the previous edition are:

- ¾ This version supports early national introduction of further reduced sulfur and aromatics contents anticipated by the European Union. Requirements of the European Fuels Directive 98/70/EC [1], including Amendment 2003/17/EC [2], are taken into account, including a maximum 10 mg/kg sulphur grade to be available in EU countries as from 2005-1-1 and is intended to replace all higher sulfur grades as from 2009-1-1.
- ¾ Test method dates are fully included in 2. Normative References.
- ¾ Dates have been removed from test method references in the text and in the tables.
- ¾ The European Fuels Directive 98/70/EC [1], including Amendment 2003/17/EC [2] refers to the test methods in EN 228, with the requirement that updated analytical methods shall be shown to give at least the same accuracy and at least the same precision as the methods they replace.
- ¾ Several new or revised test methods have been introduced.
- ¾ Table 1, Table 2 and Table 3 explicitly differentiate between requirements included in the European Fuels Directive 98/70/EC [1], including Amendment 2003/17/EC [2], and other requirements.
- ¾ From 2005-1-1 regular grade unleaded petrol may be specified in a National Annex to this standard.
- ¾ Annex A has been updated and has become the Bibliography.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

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

1 Scope

This European Standard specifies requirements and test methods for marketed and delivered unleaded petrol. It is applicable to unleaded petrol for use in petrol engine vehicles designed to run on unleaded petrol.

NOTE For the purposes of this European Standard, the terms “% (m/m)” and “% (V/V)” are used to represent respectively the mass fraction and the volume fraction.

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 237:2004, *Liquid petroleum products — Petrol — Determination of low lead concentrations by atomic absorption spectrometry*.

EN 238:1996, *Liquid petroleum products — Petrol — Determination of the benzene content by infrared spectrometry*.

EN 1601:1997, *Liquid petroleum products — Unleaded petrol — Determination of organic oxygenate compounds and total oxygen content by gas chromatography (O-FID)*.

EN 12177:1998, *Liquid petroleum products — Unleaded Petrol — Determination of benzene content by gas chromatography*.

EN 13016-1:2000, *Liquid petroleum products — Vapour pressure — Part 1: Determination of air saturated vapour pressure (ASVP)*.

EN 13132:2000, *Liquid petroleum products — Unleaded petrol — Determination of organic oxygenate compounds and total organically bound oxygen content by gas chromatography using column switching*.

EN 14517:2004, *Liquid petroleum products — Determination of hydrocarbon types and oxygenates in petrol — Multidimensional gas chromatography method*.

EN ISO 2160:1998, *Petroleum products — Corrosiveness to copper — Copper strip test (ISO 2160:1998)*.

EN ISO 3170:2004, *Petroleum liquids — Manual sampling (ISO 3170:2004)*.

EN ISO 3171:1999, *Petroleum liquids — Automatic pipeline sampling (ISO 3171:1998)*.

EN ISO 3405:2000, *Petroleum products — Determination of distillation characteristics (ISO 3405:2000)*.

EN ISO 3675:1998, *Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method (ISO 3675:1998)*.

EN ISO 4259:1995, *Petroleum products — Determination and application of precision data in relation to methods of test (ISO 4259:1992, including Cor. 1: 1993)*.

EN ISO 5163:2005, *Petroleum products — Determination of knock characteristics of motor and aviation fuels — Motor method (ISO 5163:2005)*.

EN ISO 5164:2005, *Petroleum products — Determination of knock characteristics of motor fuels — Research method (ISO 5164:2005)*.

EN ISO 6246:1997, *Petroleum products — Gum content of light and middle distillate fuels — Jet evaporation method (ISO 6246:1995)*. 

■^{AC1} EN ISO 7536:1996, *Gasoline — Determination of oxidation stability of gasoline — Induction period method (ISO 7536:1994)*.

EN ISO 12185:1996/C1:2001, *Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method (ISO 12185:1996, including Cor.1:2001)*.

EN ISO 20846:2004, *Petroleum products – Determination of sulfur content of automotive fuels– Ultraviolet fluorescence method (ISO 20846:2004)*.

EN ISO 20847:2004, *Petroleum products – Determination of sulfur content of automotive fuels – Energy-dispersive X-ray fluorescence spectrometry (ISO 20847:2004)*.

EN ISO 20884:2004, *Petroleum products – Determination of sulfur content of automotive fuels – Wavelength-dispersive X-ray fluorescence spectrometry (ISO 20884:2004)*.

ASTM D 1319:95a, *Test method for hydrocarbon types in liquid petroleum products by Fluorescent Indicator Adsorption*.

ASTM D 1613:96, *Standard test method for acidity in volatile solvents and chemical intermediates used in paint, varnish, lacquer, and related products*. ■^{AC1}

3 Sampling

■^{AC1} Samples shall be taken as described in EN ISO 3170 or EN ISO 3171 and/or in accordance with the requirements of national standards or regulations for the sampling of unleaded petrol. ■^{AC1} 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.

It is essential that for sampling of unleaded petrol the containers used to take and store the samples before testing are not contaminated with lead and/or sulfur.

4 Pump marking

Information to be marked on dispensing pumps used for delivering unleaded petrol, and the dimensions of the mark shall be in accordance with the requirements of national standards or regulations for the marking of pumps for unleaded petrol. Such 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 recommended to set marking for sulfur in a National Annex to this European Standard. The recommended designation for maximum 10 mg/kg sulfur content is “sulfur-free” in national language.

5 Requirements and test methods

5.1 Dyes and markers

The use of dyes and markers is allowed.

5.2 Additives

In order to improve the performance quality the use of additives is allowed. Suitable fuel additives without known harmful side effects are recommended in the appropriate amount, to help to avoid deterioration of driveability and emissions control durability. Other technical means with equivalent effect may also be used.

NOTE Deposit forming tendency test methods suitable for routine control purposes have not yet been identified and developed.