

**MOOTORIKÜTUSED**  
**Pliivaba mootoribensiin**  
**Nõuded ja katsemeetodid**

**Automotive fuels**  
**Unleaded petrol**  
**Requirements and test methods**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 228:2012+A1:2017 sisaldab Euroopa standardi EN 228:2012+A1:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 228:2012+A1:2017 consists of the English text of the European standard EN 228:2012+A1:2017.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 31.05.2017.	Date of Availability of the European standard is 31.05.2017.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.
Sellesse standardisse on parandus EVS-EN 228:2012+A1:2017/AC:2023 sisse viidud ja tehtud parandused tähistatud sümbolitega <b>AC</b> ja <b>AC</b> .	The Corrigendum EVS-EN 228:2012+A1:2017/AC:2023 has been incorporated into this version of the standard and the corrections made are indicated by symbols <b>AC</b> and <b>AC</b> .

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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 1 September 2012 and includes Amendment 1 approved by CEN on 17 March 2017.

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## European foreword

This document (EN 228:2012+A1:2017) 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of an identical text or by endorsement, at the latest by November 2017, and conflicting national standards shall be withdrawn at the latest by November 2017.

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 supersedes ~~A1~~ EN 228:2012 ~~A1~~.

This document includes Amendment 1 approved by CEN on 17 March 2017.

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

This document was originally prepared under a mandate given to CEN by the European Commission and the European Free Trade Association. In addition to other standards, it is intended to be complementary to the regulatory measures contained in various EU Directives.

The following is a list of significant technical changes between this European Standard and the previous edition:

- ~~A1~~ New requirements following amendment 2009/30/EC [3], 2011/63/EU [4] and 2014/77/EU [11] to the European Fuels Quality Directive 98/70/EC [1], are taken into account. ~~A1~~ Tables 1, 2, 3, 4 and A.1 explicitly differentiate between requirements included in the European Fuels Directive 98/70/EC [1], including subsequent Amendments [2], [3] and [4], and other requirements.
- Specific requirements concerning the limitation of use of methylcyclopentadienyl manganese tricarbonyl (MMT) as required by the EC have been incorporated.
- As the introduction of 10 % (V/V) of ethanol in unleaded petrol has an impact on refinery and blending processes, an update of the distillation characteristics has been considered and a new Table 3 with slightly adapted volatility classes (E70, E100 and VLI) has been introduced. Work is still ongoing to generate data that would support the idea that these changes do not affect cold starting and hot weather driveability aspects of the vehicles. These updates have been agreed upon with precaution and might be revised depending on fuel-related issues in the market.
- Further specification is given, by including separate tables on unleaded petrol grade for older vehicles that are not warranted to use unleaded petrol with a high biofuel content. A CEN/TR aiming at giving guidance on oxygenate blending has been prepared in parallel [5].
- Further clarification on how to determine the vapour pressure waiver for unleaded petrol containing ethanol, allowed on the market under exemption circumstances, is given in Annex A. The exact number of decimal points for the waiver has been clarified [4].
- Several new or revised test methods have been introduced. The European Fuels Directive 98/70/EC [1], including its Amendments [2] [3] [4], ~~A1~~ [11] ~~A1~~ refers to test methods in

EN 228:2004, 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.

- Removal of the allowance for 50 mg/kg sulfur content.
- Reference to the revised ethanol specification EN 15376.

**A1** The marking at the pump of this product is in line with the requirements of the Fuels Quality Directive and the Alternative Fuels Infrastructure Directive [12]. **A1**

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 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.

This European Standard specifies two types of unleaded petrol: one type with a maximum oxygen content of 3,7 % (m/m) and a maximum ethanol content of 10,0 % (V/V) in Table 1, and one type intended for older vehicles that are not warranted to use unleaded petrol with a high biofuel content, with a maximum oxygen content of 2,7 % (m/m) and a maximum ethanol content of 5,0 % (V/V) in Table 2.

NOTE 1 The two types are based on European Directive requirements [3], [4], <sup>A1</sup> [11] <sup>A1</sup>.

NOTE 2 For the purposes of this European Standard, the terms “% (m/m)” and “% (V/V)” are used to represent respectively the mass fraction,  $\mu$ , and the volume fraction,  $\varphi$ .

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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/A1:2003, *Liquid petroleum products — Petrol — Determination of the benzene content by infrared spectrometry*

<sup>A1</sup> EN 1601:2014<sup>1</sup>, *Liquid petroleum products — Unleaded petrol — Determination of organic oxygenate compounds and total organically bound oxygen content by gas chromatography (O-FID)* <sup>A1</sup>

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

<sup>A1</sup> EN 13016-1:2007<sup>1</sup>, *Liquid petroleum products — Vapour pressure — Part 1: Determination of air saturated vapour pressure (ASVP) and calculated dry vapour pressure equivalent (DVPE)* <sup>A1</sup>

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*

<sup>A1</sup> EN 14275:2013, *Automotive fuels — Assessment of petrol and diesel fuel quality — Sampling from retail site pumps and commercial site fuel dispensers* <sup>A1</sup>

<sup>A1</sup> EN 15376:2014, *Automotive fuels — Ethanol as a blending component for petrol — Requirements and test methods* <sup>A1</sup>

EN 15553:2007, *Petroleum products and related materials — Determination of hydrocarbon types - Fluorescent indicator adsorption method*

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<sup>1</sup> Under revision.

EN 16135:2011, *Automotive fuels — Determination of manganese content in unleaded petrol — Flame atomic absorption spectrometric method (FAAS)*

**A1** EN 16136:2015, *Automotive fuels — Determination of manganese content in unleaded petrol — Inductively coupled plasma optical emission spectrometry (ICP OES) method* **A1**

**A1** EN 16942:2016, *Fuels – Identification of vehicle compatibility – Graphical expression for consumer information* **A1**

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 3171:1988)*

**A1** EN ISO 3405:2011<sup>1</sup>, *Petroleum products — Determination of distillation characteristics at atmospheric pressure (ISO 3405:2011)* **A1**

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

**A1** EN ISO 4259:2006<sup>1</sup>, *Petroleum products — Determination and application of precision data in relation to methods of test (ISO 4259:2006)* **A1**

**A1** EN ISO 5163:2014, *Petroleum products — Determination of knock characteristics of motor and aviation fuels — Motor method (ISO 5163:2014)* **A1**

**A1** EN ISO 5164:2014<sup>1</sup>, *Petroleum products — Determination of knock characteristics of motor fuels — Research method (ISO 5164:2014)* **A1**

**A1** EN ISO 6246:2017, *Petroleum products — Gum content of light and middle distillate fuels — Jet evaporation method (ISO 6246:2017)* **A1**

EN ISO 7536:1996, *Petroleum products — Determination of oxidation stability of gasoline — Induction period method (ISO 7536:1994)*

**A1** EN ISO 12185:1996<sup>1</sup>, *Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method (ISO 12185:1996)* **A1**

EN ISO 13032:2012, *Petroleum products — Determination of low concentration of sulfur in automotive fuels — Energy-dispersive X-ray fluorescence spectrometric method (ISO 13032:2012)*

EN ISO 20846:2011, *Petroleum products — Determination of sulfur content of automotive fuels — Ultraviolet fluorescence method (ISO 20846:2011)*

EN ISO 20884:2011, *Petroleum products — Determination of sulfur content of automotive fuels — Wavelength-dispersive X-ray fluorescence spectrometry (ISO 20884:2011)*

**A1** EN ISO 22854:2016, *Liquid petroleum products - Determination of hydrocarbon types and oxygenates in automotive-motor gasoline and in ethanol (E85) automotive fuel - Multidimensional gas chromatography method (ISO 22854:2016)* **A1**