MOOTORIKÜTUSED. PLIIVABA MOOTORIBENSIIN. NÕUDED JA KATSEMEETODID

Automotive fuels - Unleaded petrol - Requirements and test methods

EESTI STANDARDIMIS- JA AKREDITEERIMISKESKUS
ESTONIAN CENTRE FOR STANDARDISATION AND ACCREDITATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 228:2025+NA:2025 sisaldab Euroopa standardi EN 228:2025 ja selle rahvusliku lisa NA:2025 ingliskeelset teksti.	This Estonian standard EVS-EN 228:2025+NA:2025 consists of the English text of the European standard EN 228:2025and its Estonian national annex NA:2025.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 23.07.2025.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 23.07.2025.
Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.	The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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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 - Unverbleite Ottokraftstoffe - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 9 June 2025.

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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
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 228:2025) 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 January 2026, and conflicting national standards shall be withdrawn at the latest by January 2026.

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 228:2012+A1:2017.

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 document and the previous edition:

— introduction of the new clause “Terms and definitions”;

— update of the normative references towards undated versions where they don't concern requirements originating from European Directives (in line with decisions by CEN/TC 19 in coordination with the European Commission), and updating the effective publication dates where required;

— introduction of several updated test methods in the tables. The European Fuels Quality Directive 98/70/EC [1], including its Amendments [2], [3], [4], [5], [6], [7] and [13] refer to test methods in EN 228:2012+A1:2017, 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;

— deletion of the recommendation under 6.1 towards provision of evidence for the biological origin of ethanol as this has now been fully covered by the (revised) EC Renewable Energy Directive;

— referencing under 6.4 of EN 16270 as a method for high boiling components in unleaded petrol;

— introduction under 6.4 of CEN/TR 17491 for further information on aniline, N-methyl aniline, N-ethyl aniline, N,N di-methyl aniline and secondary-butyl acetate when used as blending components in unleaded petrol;

— correct use of the decimal point for Final Boiling Point (FBP), distillation residue and existent gum content in limits has been implemented to align with test method reporting requirements;

— clarification under 6.7.2 on how to address situations in which the test method includes a bias-correction to the dispute method;

— introduction of the new EN ISO 4259-1 and EN ISO 4259-2 for the precision of measurement methods and results, instead of the withdrawn EN ISO 4259;

— introduction of new test method for vapour pressure, EN 13016-3, and establishing method of dispute as being EN 13016-1;

— introduction of a new micro-distillation test method, EN 17306, and establishing method of dispute as being EN ISO 3405;

— change of method of dispute for content of benzene, oxygen and methanol to EN ISO 22854;

— introduction of EN 13723 as an additional analysis method for lead content and establishing method of dispute as being EN 237, allowing an eventual change of the referee test method in the near future;

— removal of reference to EN 238 and establishing of EN ISO 22854 as referee method for benzene content;

— removal of reference to EN 16135 as a method for the determination of manganese content;

— inclusion of new GC-VUV test method, EN 18015, for the determination of olefins, aromatics, benzene, oxygen and oxygenates content;

— unification of distillation characteristics for E5 and E10 by lowering the E70 minimum values for E10 in Table 3 with 2 % *V/V*.

The marking at the pump of this product is in line with the requirements of the European Fuels Quality Directive 98/70/EC [1], including its Amendments [2], [3], [4], [5], [6], [7] and [13] and the Alternative Fuels Infrastructure Regulation [14].

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

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

1 Scope

This document 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 document 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;

— one type in Table 2 with a maximum oxygen content of 2,7 % (m/m) and a maximum ethanol content of 5,0 % (V/V) intended for older vehicles that are not warranted to use unleaded petrol defined in Table 1.

NOTE 1 The two types are based on European Directive requirements [3], [4] and [13].

NOTE 2 For the purposes of this document, the terms "% (m/m)" and "% (V/V)" are used to represent respectively the mass fraction, μ, and the volume fraction, φ.

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

EN 1601:2017, *Liquid petroleum products — Determination of organic oxygenate compounds and total organically bound oxygen content in unleaded petrol — Method by gas chromatography (O-FID)*

EN 12177:2022, *Liquid petroleum products — Unleaded petrol — Determination of benzene content by gas chromatography*

EN 13016-1:2024, *Liquid petroleum products — Vapour pressure — Part 1: Determination of air saturated vapour pressure (ASVP) and calculated dry vapour pressure equivalent (DVPE)*

FprEN 13016-3:2024, *Liquid petroleum products — Vapour pressure — Part 3: Determination of vapour pressure and calculated dry vapour pressure equivalent (DVPE) (Triple Expansion Method)*

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 13723:2002, *Petroleum products — Determination of low lead contents in gasolines — Wavelength-dispersive X-ray fluorescence spectrometry (XRF)*

EN 14275, *Automotive fuels — Assessment of petrol and diesel fuel quality — Sampling from retail site pumps and commercial site fuel dispensers*

EN 15376, *Automotive fuels — Ethanol as a blending component for petrol — Requirements and test methods*

EN 15553:2021, *Petroleum products and related materials — Determination of hydrocarbon types - Fluorescent indicator adsorption method*

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

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

EN 17306:2023, *Liquid petroleum products — Determination of distillation characteristics at atmospheric pressure — Micro-distillation*

EN 18015:2024, *Automotive fuels — Determination of hydrocarbon group types and select hydrocarbon and oxygenate compounds — Gas chromatography with vacuum ultraviolet absorption spectroscopy (GC-VUV) method*

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

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

EN ISO 3171, *Petroleum liquids — Automatic pipeline sampling (ISO 3171)*

EN ISO 3405:2019[1], *Petroleum and related products from natural or synthetic sources — Determination of distillation characteristics at atmospheric pressure (ISO 3405:2019)*

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

EN ISO 4259-1, *Petroleum and related products — Precision of measurement methods and results — Part 1: Determination of precision data in relation to methods of test (ISO 4259-1)*

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

EN ISO 5164:2014, *Petroleum products — Determination of knock characteristics of motor fuels — Research method (ISO 5164:2014)*

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

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

EN ISO 12185, *Crude petroleum, petroleum products and related products — Determination of density — Laboratory density meter with an oscillating U tube sensor (ISO 12185)*

EN ISO 13032:2024, *Petroleum and related products — Determination of low concentration of sulfur in automotive fuels — Energy-dispersive X-ray fluorescence spectrometric method (ISO 13032:2024)*

[1] Under revision at the time of publication of this document.

EN ISO 20846:2019[2], *Petroleum products — Determination of sulfur content of automotive fuels — Ultraviolet fluorescence method (ISO 20846:2019)*

EN ISO 20884:2019[3], *Petroleum products — Determination of sulfur content of automotive fuels — Wavelength-dispersive X-ray fluorescence spectrometry (ISO 20884:2019)*

EN ISO 22854:2025, *Liquid petroleum products — Determination of hydrocarbon types and oxygenates in automotive-motor gasoline and in ethanol (E85) automotive fuel — Multidimensional gas chromatography method (ISO 22854:2025)*

3 Terms and definitions

No terms and definitions are listed in this document.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

4 Sampling

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. The national requirements shall be set out in detail or shall be referred to by reference in a National Annex to this document.

In view of the sensitivity of some of the test methods referred to in this document, 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, especially with lead and/or sulfur.

5 Pump marking

Information to be marked on dispensing pumps and nozzles used for delivering unleaded petrol, and the identifier (shape, colour and size) shall be in accordance with EN 16942.

Labelling shall be clearly visible, easily legible and displayed at any point where unleaded petrol with metallic additives is made available to consumers. The label shall contain the following text: “Contains metallic additives” in the national language(s) and shall be laid down in the National Annex to this document.

It is also recommended that additional pump marking be applied to specify the research octane number (RON) supplied.

[2] Under revision at the time of publication of this document.

[3] As impacted by EN ISO 20884:2019/A1:2021. Under revision at the time of publication of this document.