



SLOVENSKI STANDARD
oSIST prEN 15293:2009
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Goriva za motorna vozila - Gorivo etanol (E85) za motorna vozila - Zahteve in preskusne metode

Automotive fuels - Ethanol (E85) automotive fuel - Requirements and test methods

Kraftstoffe für Kraftfahrzeuge - Ethanol (E85) Autokraftstoff - Anforderungen und Prüfverfahren

Carburants pour automobiles - Carburant automobile Ethanol (E85) - Exigences et méthodes d'essai

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Automotive fuels - Ethanol (E85) automotive fuel - Requirements and test methods

Carburants pour automobiles - Carburant pour automobiles
Ethanol (E85) - Exigences et méthodes d'essai

Kraftstoffe für Kraftfahrzeuge - Ethanol (E85) Autokraftstoff
- Anforderungen und Prüfverfahren

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 19.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (prEN 15293:2009) 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 document is currently submitted to the CEN Enquiry.

This document will supersede CWA 15293:2005.

This document will supersede CEN/CWA 15293:2005, which has originally been prepared under a Mandate given to CEN by the European Commission. This document supports EU Directive(s) [1], [2] and [3].

Significant technical changes between this European Standard and the CEN Workshop agreement are:

- the fuel requirements do allow the car manufacturers to optimize the ignition setting over the whole range of 0 % to 85 % of ethanol, whereas former limits of for instance vapour pressure and MON/RON were calculated on the basis of the percentage. This should give the user the benefit of the improved octane of the alcohol;
- the requirements towards contaminants originating mainly from ethanol are aligned with the meanwhile published EN 15376. As alignment of units for elemental contaminants is pursued, a mean density value of 0,78 g/cm³ has been used;
- the specification has been set to allow for the use of denatured ethanol as a blending component;
- newly developed ethanol test methods are used, which show a better applicability to Ethanol (E85) automotive fuel and all test methods have been assessed for their effective applicability;
- the climate requirements do allow different percentages of ethanol to be blended, based on field experience, of which some limits are still under discussion. These will be included at a later stage;

Furthermore, some of the determination methods referenced are still being investigated in terms of correct application and precision.

1 Scope

This European Standard specifies requirements and test methods for marketed and delivered Ethanol (E85) automotive fuel. It is applicable to Ethanol (E85) for use in spark ignition engine vehicles designed to run on Ethanol (E85).

Ethanol (E85) is a mixture of nominally 85 % ethanol and petrol, but also including the possibility of having different 'seasonal grades' containing more than 50 % ethanol.

NOTE For the purposes of this document, 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 228, *Automotive fuels – Unleaded petroleum – Requirements and test methods*

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

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

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

EN 15485:2007, *Ethanol as a blending component for petrol — Determination of sulfur content — Wavelength dispersive X-ray fluorescence spectrometric method*

EN 15486:2007, *Ethanol as a blending component for petrol — Determination of sulfur content — Ultraviolet fluorescence method*

EN 15487:2007, *Ethanol as a blending component for petrol — Determination of phosphorus content — Ammonium molybdate spectrometric method*

EN 15488:2007, *Ethanol as a blending component for petrol — Determination of copper content — Graphite furnace atomic absorption spectrometric method*

EN 15489:2007, *Ethanol as a blending component for petrol — Determination of water content — Karl-Fischer coulometric titration method*

EN 15490:2007, *Ethanol as a blending component for petrol — Determination of pHe*

EN 15491:2007, *Ethanol as a blending component for petrol — Determination of total acidity — Colour indicator titration method*

EN 15492:2008 *Ethanol as a blending component for petrol — Determination of inorganic chloride and sulfate content — Ion chromatographic method*

prEN 15692:2008, *Ethanol as a blending component for gasoline — Determination of water content — Karl Fischer potentiometric titration method*

prEN 15769:2008, *Ethanol as a blending component of petrol — Determination of appearance — Visual method*

prEN 15837:2008, *Ethanol as a blending component for petrol — Determination of phosphorus, copper and sulfur content — Inductively coupled plasma optical emission spectrometric direct 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 3171:1988)*

EN ISO 4259, *Petroleum products — Determination and application of precision data in relation to methods of test (ISO 4259:2006)*.

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)*

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

EN ISO 12185:1996, *Crude petroleum and petroleum products — Determination of density — Oscillating U-tube method (ISO 12185:1996)*

ASTM D 1613-00, *Standard test method for acidity in volatile solvents and chemical intermediates used in paint, varnish, lacquer, and related products*

ASTM D 6423-99, *Standard test method for determination of pH_e of ethanol, denatured fuel ethanol, and fuel ethanol (Ed75-Ed85)*

DIN 51627-4, *Automotive fuels - Test methods - Part 4: Determination of electrical conductivity in ethanol fuel*

3 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 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 Ethanol (E85), and the dimensions of the mark shall be in accordance with the requirements of national standards or regulations for the marking of pumps for Ethanol (E85).

NOTE 1 Such requirements shall be set out in detail or shall be referred to by reference by the user of the product or by authorities allowing the product on the market.

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NOTE 2 The recommended designation for Ethanol (E85) and its seasonal derivatives is “E85”.

5 Requirements and test methods**5.1 Blend components**

Ethanol (E85) automotive fuel should be based on unleaded petrol complying with EN 228 and ethanol complying with EN 15376.

5.2 Dyes and markers

The use of dyes and markers is allowed provided they do not cause harmful side effects to vehicles and fuel distribution systems.

5.3 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.

CAUTION — Ethanol (E85) shall be free from any adulterant or contaminant that may render the fuel unacceptable for use in petrol engine vehicles designed to run on unleaded petrol.

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

5.4 Phosphorus

In order to protect automotive catalyst systems, phosphorus containing compounds shall not be included in Ethanol (E85).

5.5 Denaturants

The presence of petrol that conforms with EN 228 is generally considered sufficient to render Ethanol (E85) a denatured product. If the presence of petrol is not recognized as a denaturant of ethanol by the relevant national authority, to avoid material compatibility issues with automotive engines and fuel systems, it is recommended to select denaturants from the list below that are known to be non harmful to vehicle systems:

- Ethyltertbutylether (ETBE),
- Methyltertbutylether (MTBE),
- Tertiary Butyl Alcohol (TBA),
- 2-methyl-1-propanol (isobutanol) and
- 2-propanol (isopropanol).

The concentration of denaturant(s) is at the discretion of national authorities, but the final Ethanol (E85) automotive fuel shall still conform to the requirements as given in Table 1 and Table 2.

NOTE The recommendations of ASTM D 4806 [4] regarding denaturants should be adhered to.

5.6 Generally applicable requirements and test methods

When tested by the methods indicated in Tables 1 and 2, Ethanol (E85) automotive fuel shall be in accordance with the limits specified in Tables 1 and 2. The test methods listed in Table 1 have been found applicable to Ethanol (E85) automotive fuel, either via an assessment study or a interlaboratory test programme.

Additional procedural requirements to be followed are indicated in Annex A.

NOTE Precision data specific for Ethanol (E85) will be developed by CEN in the future.

5.7 Climatically dependent requirements and test methods

5.7.1 Water tolerance

Given the known potential for some automotive petrol to absorb water, suppliers shall ensure that no water segregation occurs under the range of climatic conditions experienced in the country concerned. When there is a risk of water separation, anti-corrosion additives shall be incorporated.

The solubility of hydrocarbon in Ethanol (E85) automotive fuel and blends with petrol as may occur in multifuel-capable vehicles decreases with lowering temperature and increasing water content. Separation of the hydrocarbon from the fuel will adversely affect cold starting and driveability and denaturing. Water may affect the calibration of some types of composition sensors of multifuel-capable vehicles.

NOTE For further information on preventing contamination by water or sediment that may occur in the supply chain it is advisable to check CEN/TR 15367-2 [5]. A third part on prevention of cross-contamination is under preparation.

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Table 1 - Requirements and test methods for ethanol (E85) automotive fuel

Property	Units	Limits		Test Method ^a (See 2. Normative references)
		Min.	Max.	
Research octane number, RON		104,0	--	EN ISO 5164
Motor octane number, MON		88,0	--	EN ISO 5163
Density (at 15 °C)	kg/m ³	760,0	800,0	EN ISO 12185
Oxidation stability	minutes	360	--	EN ISO 7536
Existent gum content (solvent washed)	mg/100 ml	--	5	EN ISO 6246
Copper strip corrosion (3 h at 50 °C)	rating	class 1		EN ISO 2160
Appearance ^b		clear and colourless		prEN 15769
Total acidity (expressed as acetic acid) ^c	% (m/m)		0,005	EN 15491 ASTM D 1613
pHe ^{c, d}		6,5	9,0	EN 15490 ASTM D 6423
Electrical conductivity	µS/cm		2,5	DIN 51627-4
Methanol content ^e	% (V/V)	--	1,0	EN 1601 ^f
Higher saturated (C3-C5) mono-alcohols content	% (V/V)	--	6,0	EN 1601 ^f
Ethers (5 or more C atoms) content	% (V/V)	--	7,7	EN 1601 ^f
Water content ^c	% (m/m)	--	0,400	EN 15489 ^g prEN 15692
Inorganic chloride content	mg/kg	--	6,0 ^h	EN 15492 ⁱ
Copper content ^c	mg/kg	--	0,10	EN 15488 ^k prEN 15837 ^l
Phosphorus content ^c	mg/l	--	0,15	EN 15487 ^m prEN 15837 ^l
Sulfur content ^c	mg/kg	--	10,0	EN 15485 ⁿ EN 15486 ^o
Sulfate content	mg/kg	--	4,0	EN 15492 ⁱ

^a See also 5.8.1

^b This shall be determined at ambient temperature or 15 °C whichever is higher

^c See also 5.8.2

^d Requirement might be removed if problems on measurement precision remain at the time of publication of this Standard and if electrical conductivity brings a feasible alternative

^e Stabilising agents shall be added

^f Work within CEN has revealed that the regular ethanol determination method [6] cannot be applied. See also A.2

^g See also A.3

^h To be validated and might be lowered following test method and distribution assessment.

ⁱ See also A.4

^k See also A.5

^l See also A.6

^m See also A.7

ⁿ See also A.8

^o See also A.9