SLOVENSKI STANDARD
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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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English Version

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

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

Kraftstoff für Kraftfahrzeuge - Ethanolkraftstoff (E85) für Kraftfahrzeuge - Anforderungen und Prüfverfahren

This Technical Specification (CEN/TS) was approved by CEN on 28 September 2010 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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Foreword

This document (CEN/TS 15293:2011) 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.

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 CEN/CWA 15293:2005.

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 % (*V/V*) to 85 % (*V/V*) 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, even though some limits are set as indicative pending further field data;

— 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/cm^3 has been used;

— the specification has been set to allow for the use of denatured and undenatured ethanol as a blending component, depending on national legislation;

— newly developed ethanol test methods are used, which show a better applicability to Ethanol (E85) automotive fuel. Most of the 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 study.

Furthermore, some of the determination methods referenced are still being investigated in terms of correct application and precision. This, and the fact that production processes need to be assessed on possibility to achieve the required or future limits, underlines the choice for a CEN Technical Specification as an intermediate step.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

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

Ethanol (E85) automotive fuel is a mixture of nominally 85 % (*V/V*) ethanol complying to EN 15376 and petrol complying to EN 228, but also including the possibility of having different "seasonal grades" containing more than 50 % (*V/V*) 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 petrol — 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 15491:2007, *Ethanol as a blending component for petrol — Determination of total acidity — Colour indicator titration method*

prEN 15492:2010, *Ethanol as a blending component for petrol — Determination of inorganic chloride and sulfate content — Ion chromatographic method*

EN 15692:2009, *Ethanol as a blending component for petrol — Determination of water content — Karl Fischer potentiometric titration method*

EN 15837:2009, *Ethanol as a blending component for petrol — Determination of phosphorus, copper and sulfur content — Direct method by inductively coupled plasma optical emission spectrometry (ICP OES)*

EN 15938:2010, *Automotive fuels — Ethanol blending component and ethanol (E85) automotive fuel — Determination of electrical conductivity*

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)*

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 Ethanol (E85) automotive fuel. 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 sometimes included in the test method standard.

It is essential that for sampling of Ethanol (E85) automotive fuel the containers used to take and store the samples before testing are free from any contamination.

4 Pump marking

Information to be marked on dispensing pumps used for delivering Ethanol (E85) automotive fuel, 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) automotive fuel. Such requirements shall be set out in detail or shall be referred to by reference in a national annex to this European Standard.

NOTE The recommended designation for Ethanol (E85) automotive fuel and its seasonal derivatives is "E85".

5 Requirements and test methods

5.1 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.

5.2 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.

CAUTION — Ethanol (E85) automotive fuel 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 and ethanol (E85) automotive fuel.

NOTE Test methods for deposit forming tendency that are suitable for routine control purposes have not yet been identified and developed.

5.3 Phosphorus

In order to protect automotive catalyst systems, phosphorus containing additives shall not be used in Ethanol (E85) automotive fuel.

5.4 Denaturants

The presence of petrol that conforms to EN 228 is generally considered sufficient to render Ethanol (E85) automotive fuel 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 D4806 [4] regarding denaturants should be regarded.

5.5 Generally applicable requirements and test methods

5.5.1 Overall requirements

Ethanol (E85) automotive fuel is a mixture of on the basis of ethanol complying to EN 15376 and petrol complying to EN 228. When tested by the methods indicated in Table 1, Ethanol (E85) automotive fuel shall be in accordance with the limits specified in Table 1. The test methods listed in Table 1 have been found

applicable to Ethanol (E85) automotive fuel, either by full assessment or by theoretical evaluation. In the latter case, these findings are under practical validation by CEN.

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

Property	Units	Limits Min.	Limits Max.	Test Method [a] (See Clause 2)
Density (at 15 °C)	kg/m^3	760,0	800,0	EN ISO 12185
Oxidation stability	min	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
Total acidity (expressed as acetic acid)	% (*m/m*)		0,005	EN 15491
Electrical conductivity [b]	µS/cm		1,5	EN 15938
Methanol content	% *(V/V)*	--	1,0	EN 1601 [d]
Higher saturated (C3-C5) mono-alcohols content	% *(V/V)*	--	6,0	EN 1601 [d]
Ethers (five or more C atoms) content	% *(V/V)*	--	11,0	EN 1601 [d]
Water content [c]	*% (m/m)*	--	0,400	EN 15489 [e] EN 15692 [e]
Inorganic chloride content	mg/kg	--	1,2 [f]	prEN 15492 [g]
Copper content [c]	mg/kg	--	0,10	EN 15488 [h] EN 15837 [i]
Phosphorus content [c]	mg/l	--	0,15	EN 15487 [k] EN 15837 [i]
Sulfur content [c]	mg/kg	--	10,0	EN 15485 [l] EN 15486 [m]
Sulfate content	mg/kg	--	4,0 [n]	prEN 15492 [g]

[a] See also 5.7.1.

[b] If the required limit is not met, one should check for effects of corrosion inhibitors on conductivity. In that case, a pHe between 6,5 and 9,0, determined by means of either EN 15490 [9] or ASTM D6423-99 [11], indicates compliance of the sample. Limit as such under consideration.

[c] See also 5.7.2.

[d] Work within CEN has revealed that the regular ethanol determination method [8] cannot be applied. See also A.2. Test method applicability of this method and others is under consideration by CEN.

[e] See also A.3.

[f] This limit is to be validated in the future following test method, production and distribution assessment.

[g] See also A.4.

[h] See also A.5.

[i] See also A.6.

[k] See also A.7.

[l] See also A.8.

[m] See also A.9.

[n] This limit is to be validated and might be lowered following production and distribution assessment.

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