

SLOVENSKI STANDARD

SIST EN 15376:2011

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Nadomešča:

SIST EN 15376:2008+A1:2009

Goriva za motorna vozila - Etanol kot komponenta za dodajanje motornemu bencinu - Zahteve in preskusne metode

Automotive fuels - Ethanol as a blending component for petrol - Requirements and test methods

Kraftstoffe für Kraftfahrzeuge - Ethanol zur Verwendung als Blendkomponente in Ottokraftstoff - Anforderungen und Prüfverfahren

Carburants pour automobiles - Ethanol comme base de mélange à l'essence - Exigences et méthodes d'essais

Ta slovenski standard je istoveten z: **EN 15376:2011**

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75.160.20	Tekoča goriva	Liquid fuels

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15376

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ICS 71.080.60; 75.160.20

Supersedes EN 15376:2007+A1:2009

English Version

**Automotive fuels - Ethanol as a blending component for petrol -
Requirements and test methods**

Carburants pour automobiles - Ethanol comme base de
mélange à l'essence - Exigences et méthodes d'essais

Kraftstoffe für Kraftfahrzeuge - Ethanol zur Verwendung als
Blendkomponente in Ottokraftstoff - Anforderungen und
Prüfverfahren

This European Standard was approved by CEN on 24 December 2010.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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 United Kingdom.

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Contents

Page

Foreword.....	3
1 Scope	4
2 Normative references	4
3 Sampling	5
4 Requirements and test methods	5
4.1 Dyes and markers	5
4.2 Additives	5
4.3 Denaturing	5
4.4 Generally applicable requirements and related test methods	6
4.5 Climate dependent requirements and related test methods	7
4.6 Precision and dispute	7
Bibliography	8

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Foreword

This document (EN 15376:2011) 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.

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 August 2011, and conflicting national standards shall be withdrawn at the latest by August 2011.

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 has originally been prepared under mandate M/344 given to CEN by the European Commission and the European Free Trade Association along with other standards intended to be complementary to the regulatory measures contained in various EU Directives, see [1], [2], [3] and [4].

If bio-ethanol is meant for use as automotive fuel component, this document applies. It is intended to call up this European Standard in EN 228, in order to define the quality of (bio)ethanol which is added/blended to the petrol.

This document supersedes EN 15376:2007+A1:2009.

The major updates of this second version concern the inclusion of newly developed methods for determination of appearance and of the content of oxygenates, water, involatile material, sulfate, inorganic chloride, copper and phosphorus. All of these methods were under development at the time of publication of the former version. In addition some alignment on the units in terms of mass/mass has been developed.

An electrical conductivity test method has also been developed on the basis of a DIN test method [5] in order to adequately limit the strong acidity and the base alkalinity of the product, which cannot be sufficiently determined via pH_e [6].

The former version gave all relevant characteristics, requirements and test methods for (bio)ethanol, which were known at that time to be necessary to define the product to be used up to a maximum 5 % (V/V) blending component for automotive petrol fuel. With the actual document the percentage of use is expanded to allow use at percentages up to 10 % (V/V) and the requirements are updated accordingly. Now that a test method is available a sulfate limit has also been set.

According to the CEN/CENELEC Internal Regulations, the national standards organizations 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 15376:2011 (E)

1 Scope

This European Standard specifies requirements and test methods for marketed and delivered ethanol to be used as an extender for automotive fuel for petrol engine vehicles in accordance with the requirements of EN 228.

NOTE 1 This document gives all relevant characteristics, requirements and test methods for (bio)ethanol, which are known at this time to be necessary to define the product to be used up to a maximum 10 % (V/V) blending component for automotive petrol fuel. The requirements need to be restudied if the percentage or use is expanded beyond 10 % volume.

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

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 15484:2007, *Ethanol as a blending component for petrol — Determination of inorganic chloride — Potentiometric method*

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 15691:2009, *Ethanol as a blending component for petrol — Determination of dry residue (involatile material) — Gravimetric method*

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

EN 15721:2009, *Ethanol as a blending component for petrol — Determination of higher alcohols, methanol and volatile impurities — Gas chromatographic method*

EN 15769:2009, *Ethanol as a blending component of petrol — Determination of appearance — Visual 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 3170:2004, *Petroleum liquids — Manual sampling (ISO 3170:2004)*

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

3 Sampling

Samples shall be taken as described in EN ISO 3170 and/or in accordance with the requirements of national standards or regulations for the sampling of alcohol. 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 included in the test method standard.

4 Requirements and test methods

4.1 Dyes and markers

The use of dyes or markers is allowed.

4.2 Additives

For distribution purposes, it is recommended that ethanol producers and downstream distributors and petrol blenders consider the need to add anti-corrosion additives to fuel grade ethanol. Suitable fuel additives without known harmful side effects and that are compatible with the finished petrol are recommended in the appropriate amount. These should not infringe patents through commingling.

NOTE Anticorrosion additives can increase electrical conductivity of the product, depending on anti-corrosion used and starting point of ethanol.

4.3 Denaturing

Denaturants, as required by European and national customs regulations are permitted, provided they do not cause harmful side effects to vehicles and petroleum distribution systems.

Where denaturing of the automotive ethanol is required, it is strongly recommended to select denaturants from the list below that are known to be non harmful to vehicle systems:

- automotive petrol conforming to EN 228,
- Ethyltertbutylether (ETBE),
- Methyltertbutylether (MTBE),
- Tertiary Butyl Alcohol (TBA),
- 2-methyl-1-propanol (isobutanol) and
- 2-propanol (isopropanol).

Any or all of these denaturants may be used alone or together, except isobutanol and isopropanol that are easily removed, so it is advisable to use them in combination with another denaturant.

EN 15376:2011 (E)

NOTE The concentration of denaturant(s) is at the discretion of national authorities and should not be in contradiction with EN 228 requirements.

4.4 Generally applicable requirements and related test methods

4.4.1 When tested by the methods indicated in Table 1, ethanol before denaturing shall be in accordance with the limits specified in Table 1.

NOTE For calculation of the reported results from mg/l to mg/kg, the density as measured or as given in Annex A of EN 15486:2007 should be used.

Table 1 — Generally applicable requirements and test methods for undenatured ethanol

Property	Unit	Limits		Test method ^a (See Clause 2. Normative references)
		minimum	maximum	
Ethanol + higher saturated alcohols content	% (m/m)	98,7		EN 15721 ^b
Higher saturated (C3-C5) mono-alcohols content ^c	% (m/m)		2,0	EN 15721 ^b
Methanol content	% (m/m)		1,0	EN 15721 ^b
Water content ^d	% (m/m)		0,300	EN 15489 EN 15692
Total acidity (expressed as acetic acid)	% (m/m)		0,007	EN 15491
Electrical conductivity	µS/cm		2,5	EN 15938
Appearance		clear and colourless		EN 15769
Inorganic chloride content ^e	mg/kg		6,0	EN 15484 prEN 15492
Sulfate content	mg/kg		4,0	prEN 15492
Copper content ^f	mg/kg		0,100	EN 15488 EN 15837
Phosphorus content ^g	mg/l		0,15	EN 15487 EN 15837
Involatile material content	mg/100ml		10	EN 15691
Sulfur content ^h	mg/kg		10,0	EN 15485 EN 15486 EN 15837

^a See 4.6.1.

^b The result of this test method refers to the water free sample.

^c Higher saturated alcohols have the chemical formula $C_nH_{2n+1}OH$, where n is 3, 4 or 5.

^d See 4.6.2.

^e See 4.6.3.

^f See 4.6.4.

^g See 4.6.5.

^h See 4.6.6.

4.4.2 In case of a need for identification of the biological origin of ethanol, a traceable record of biological origin is the recommended method.

NOTE An alternative is age determination, which is based on the beta(minus) decay of the radioactive carbon isotope C-14 [7]. This method is considered too laborious for frequent testing, but it may be considered as a useful tool to determine cases where the audit trail approach is contested.

4.5 Climate dependent requirements and related test methods

Given the known potential for ethanol to absorb water, suppliers shall ensure that no water segregation occurs under the range of climatic and fuel distribution conditions experienced in the country concerned.

4.6 Precision and dispute

4.6.1 All test methods referred to in this document include a precision statement according to EN ISO 4259. In cases of dispute, the procedures for resolving the dispute and interpretation of the results based on test method precision, described in EN ISO 4259, shall be used.

4.6.2 In cases of dispute concerning water content, EN 15489 shall be used.

4.6.3 In cases of dispute concerning inorganic chloride content, prEN 15492:2010 shall be used.

4.6.4 In cases of dispute concerning copper content, EN 15488 shall be used [8].

4.6.5 In cases of dispute concerning phosphorus content, EN 15487 shall be used [8].

4.6.6 In cases of dispute concerning sulfur, either EN 15485 or EN 15486 shall be used [8].

NOTE 1 EN 15485 and EN 15486 have special provisions for ethanol which are not incorporated in the usual petroleum test methods such as EN ISO 20846 [9] and EN ISO 20884 [10].

NOTE 2 It is expected that EN 15837 becomes the method in case of dispute for copper, phosphorus and sulfur content once ICP-OES instruments are sufficiently available in the market to support such a decision.