Liquid petroleum products - Unleaded petrol - Determination of organic oxygenate compounds and total organically bound oxygen content by gas chromatography (O-FID)

EESTI STANDARDIKESKUS
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NATIONAL FOREWORD

See Eesti standard EVS-EN 1601:2014 sisaldab Euroopa standardi EN 1601:2014 inglisekeelset teksti.	This Estonian standard EVS-EN 1601:2014 consists of the English text of the European standard EN 1601:2014.
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 30.04.2014.	Date of Availability of the European standard is 30.04.2014.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

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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EUROPEAN STANDARD

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English Version

Liquid petroleum products - Unleaded petrol - Determination of organic oxygenate compounds and total organically bound oxygen content by gas chromatography (O-FID)

Produit pétroliers liquides - Essence sans plomb - Détermination des composés oxygénés organiques et de la teneur totale en oxygène organiquement lié par chromatographie en phase gazeuse (O-FID)

Flüssige Mineralölerzeugnisse - Unverbleite Ottokraftstoffe - Bestimmung sauerstoffhaltiger organischer Verbindungen und des Gesamtgehalts an organisch gebundenem Sauerstoff mittels Gaschromatographie (O-FID)

This European Standard was approved by CEN on 18 January 2014.

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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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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Contents

Foreword

This document (EN 1601:2014) 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 October 2014, and conflicting national standards shall be withdrawn at the latest by October 2014.

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 EN 1601:1997.

The major updates towards the former version are:

— Inclusion of a dilution procedure to measure an oxygenate compound content higher than 15 % (*m/m*). In this procedure detailed in Clause 9, the sample is diluted (1:1 or 1:2 mass/mass) with an oxygenate free petrol, before the addition of the internal standard and the analysis. Precision data have not been evaluated for this procedure;

— The previous precision data for oxygen content covered the range 1,5 % (*m/m*) to 3,0 % (*m/m*). The data precision for oxygen content has been updated for the range 2,1 % (*m/m*) to 3,9 % (*m/m*), based on Round Robins data from 2005 to 2011 available from DIN-FAM, Germany;

— The scope of the test method has been updated to include petrol with higher total oxygen content and with higher oxygenate contents than mentioned in the former edition; the test method is now applicable for petrol (automotive motor gasoline) with a total oxygen content up to 3,9 % (*m/m*), and/or with an individual oxygenate compound content higher than 15 % (*m/m*). Such petrol is specified in EN 228 [1]. Precision data have not been evaluated for this procedure and consequently the previous precision data for a individual oxygenate compound content in the range of 0,17 % (*m/m*) higher thanto 15 % (*m/m*) have not been updated or extended above 15 % (*m/m*), in order to introduce for instance automotive ethanol (E85) fuel in the scope.

— Deletion of the original Annex A on densities of oxygenate compounds and inclusion of some of them in Table 1;

— Updated chromatograms and improved description of the gas chromatographic equipment with inclusion of a schematic instrument O-FID instrument configuration in the new Annex A.

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

1 Scope

This European Standard specifies a gas chromatographic method for the quantitative determination, in unleaded petrol having a final boiling point not greater than 220 °C, of individual organic oxygenate compounds in the range 0,17 % (*m/m*) to 15 % (*m/m*) in a direct analysis (without dilution), and total organically bound oxygen up to 3,9 % (*m/m*).

For samples for which one of the oxygenate compounds content is higher than 15 % (*m/m*), a procedure with a dilution of the sample before the analysis is given.

NOTE 1 Precision data are not available for an oxygenate compound content higher than 15 % (*m/m*); see Foreword.

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

WARNING — The use of this European Standard may involve hazardous materials, operations and equipment. This European Standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this European Standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

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 ISO 3170, *Petroleum liquids - Manual sampling (ISO 3170)*

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

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

EN ISO 3838, *Crude petroleum and liquid or solid petroleum products - Determination of density or relative density - Capillary-stoppered pyknometer and graduated bicapillary pyknometer methods (ISO 3838)*

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

3 Principle

After separation using a capillary column, the organic oxygenate compounds are selectively converted to carbon monoxide, hydrogen and carbon in a pyrolytic cracking reactor.

In a hydrogenation reactor, carbon monoxide is then converted to methane and subsequently detected using a flame ionization detector (FID).

NOTE Guidance on the oxygen selective detection (O-FID) technique is given in Annex A.