

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

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 1601:2017 sisaldab Euroopa standardi EN 1601:2017 ingliskeelset teksti.	This Estonian standard EVS-EN 1601:2017 consists of the English text of the European standard EN 1601:2017.
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.
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English Version

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

Produits pétroliers liquides - Détermination des
composés oxygénés organiques et de la teneur totale
en oxygène organiquement lié dans l'essence sans
plomb - Méthode par chromatographie en phase
gazeuse (O-FID)

Flüssige Mineralölerzeugnisse - Bestimmung
sauerstoffhaltiger organischer Verbindungen und des
Gesamtgehalts an organisch gebundenem Sauerstoff in
unverbleitem Ottokraftstoff - Methode mittels
Gaschromatographie (O-FID)

This European Standard was approved by CEN on 19 May 2017.

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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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European foreword

This document (EN 1601:2017) 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of an identical text or by endorsement, at the latest by February 2018, and conflicting national standards shall be withdrawn at the latest by February 2018.

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 1601:2014.

Significant changes between this document and EN 1601:2014 include:

- Improved description of the carrier gases, equipment and procedure for cooling the samples;
- Expansion of Table 1 on the oxygenate compounds data, a.o. the addition of ETBE and TAEE;
- Editorial changes in order to clarify the test procedure.

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

Introduction

This European Standard is an update of the first edition (EN 1601:1997).

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]. The previous precision data for an individual oxygenate compound content in the range of 0,17 % (*V/V*) to 15 % (*V/V*) has not been updated or extended above 15 % (*V/V*).

A dilution procedure to measure an oxygenate compound content higher than 15 % (*m/m*) is included in the standard. 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.

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 The conversion from percent mass to percent volume is done using the calculation mentioned in 8.3 and 9.5.3.

NOTE 2 Precision data are not available for an oxygenate compound content higher than 15 % (m/m); see Introduction.

NOTE 3 For the purposes of this European Standard, the terms “% (m/m)” and “% (V/V)” are used to represent respectively the mass fraction, μ , respectively the volume fraction, φ .

WARNING —The use of this European Standard can 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 users of this European Standard to take appropriate measures to ensure the safety and health of personnel prior to application of the standard, and fulfil statutory and regulatory requirements for this purpose.

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.