

Liquid petroleum products - Unleaded petrol -
Determination of benzene content by gas
chromatography

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Liquid petroleum products - Unleaded petrol - Determination of benzene content by gas chromatography

Produits pétroliers liquides - Essence sans plomb -
Détermination de la teneur en benzène par
chromatographie en phase gazeuse

Flüssige Mineralölerzeugnisse - Unverbleiter
Ottokraftstoff - Bestimmung des Benzolgehaltes mittels
Gaschromatographie

This European Standard was approved by CEN on 16 October 2022.

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COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 12177:2022) 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of an identical text or by endorsement, at the latest by May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

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 12177:1998.

At the time of the development of the test method, the ethanol content of gasoline was limited to 5 % (V/V) which was reflected in the scope of the test method. Since several years, fuels containing up to 10 % of ethanol (3,7 % (m/m)) are common in the European market. This revision is meant to extend the scope of the test methods to those fuels, thus reflecting market needs.

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1 Scope

This document specifies a column switching gas chromatographic method for the quantitative determination of benzene content in the range 0,05 % (V/V) to 6 % (V/V) in unleaded petrol having a final boiling point not greater than 220 °C.

The method described in this document is suitable for determining benzene in petrol, including petrol containing oxygenates up to E10 (up to 3,7 % (m/m) oxygen content), in line with the relevant EC Directives [1].

NOTE For the purposes of this document, the terms "% (V/V)" and "% (m/m)" are used to represent respectively the volume fraction and the mass fraction.

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 pycnometer and graduated bicapillary pycnometer methods (ISO 3838)*

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

3 Terms and definitions

No terms and definitions are listed in this document.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/>

4 Principle

The benzene-containing fraction is isolated from the sample using a capillary column and, in a second capillary column, the benzene is separated and detected using a flame ionization detector.

NOTE 1 Some oxygenates are known to interfere with the determination of benzene using a single column gas chromatographic method.

NOTE 2 Guidance on the column switching technique is given in Annex A.