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BSI Standards Publication

Petroleum products — Determination of aromatic hydrocarbon types in middle distillates — High performance liquid chromatography method with refractive index detection

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National foreword

This British Standard is the UK implementation of EN 12916:2024. It supersedes BS EN 12916:2019+A1:2022, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PTI/15, Natural Gas and Gas Analysis.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Amendments/corrigenda issued since publication

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March 2024

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English Version

Petroleum products - Determination of aromatic hydrocarbon types in middle distillates - High performance liquid chromatography method with refractive index detection

Produits pétroliers - Détermination des familles d'hydrocarbures aromatiques dans les distillats moyens - Méthode par chromatographie liquide à haute performance avec détection par réfractométrie différentielle

Mineralölerzeugnisse - Bestimmung von aromatischen Kohlenwasserstoffgruppen in Mitteldestillaten - Hochleistungsflüssigkeitschromatographie-Verfahren mit Brechungsindex-Detektion

This European Standard was approved by CEN on 14 December 2023.

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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
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European foreword

This document (EN 12916:2024) 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 September 2024, and conflicting national standards shall be withdrawn at the latest by September 2024.

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 12916:2019+A1:2022.

Major change compared to EN 12916:2019+A1:2022 is the introduction of an Annex C with instructions on determination of tri+-aromatics and additional sampling requirements. This should improve lab precision when testing paraffinic diesel products. Next, the practical instructions for these type of samples in Annex B have been improved and exemplary chromatograms have been introduced. The instructions on storage precautions after sampling have been restricted to paraffinic diesel products only.

The addition of a calibration procedure with reference material ensures better results for all products. Furthermore, a study executed in 2021 has delivered confirmation of the published precision for PAH and DAH for concentration range from (6 – 10) % (*m/m*).

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

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1 Scope

This document specifies a test method for the determination of the content of mono-aromatic, di-aromatic and tri+-aromatic hydrocarbons in diesel fuels, paraffinic diesel fuels and petroleum distillates.

This document specifies two procedures, A and B.

Procedure A is applicable to diesel fuels that may contain fatty acid methyl esters (FAME) up to 30 % (V/V) (as in [1], [2] or [3]) and petroleum distillates in the boiling range from 150 °C to 400 °C (as in [4]).

Procedure B is applicable to paraffinic diesel fuels with up to 7 % (V/V) FAME. This procedure does not contain a dilution of the sample in order to determine the low levels of aromatic components in these fuels.

The polycyclic aromatic hydrocarbons content is calculated from the sum of di-aromatic and tri+-aromatic hydrocarbons and the total content of aromatic compounds is calculated from the sum of the individual aromatic hydrocarbon types.

Compounds containing sulfur, nitrogen and oxygen can interfere in the determination; mono-alkenes do not interfere, but conjugated di-alkenes and poly-alkenes, if present, can do so. The measurement ranges that apply to this method are given in Table 2 and Table 3.

NOTE 1 For the purpose of this document, the terms “% (m/m)” and “% (V/V)” are used to represent the mass fraction, μ , and the volume fraction, φ , of a material respectively.

NOTE 2 By convention, the aromatic hydrocarbon types are defined on the basis of their elution characteristics from the specified liquid chromatography column relative to model aromatic compounds. Their quantification is performed using an external calibration with a single aromatic compound for each of them, which can be representative of the aromatics present in the sample. Alternative techniques and test methods can classify and quantify individual aromatic hydrocarbon types differently.

NOTE 3 Backflush is part of laboratory-internal maintenance.

WARNING — The use of this document can 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 users of this document 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 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 14214, *Liquid petroleum products — Fatty acid methyl esters (FAME) for use in diesel engines and heating applications — Requirements and test methods*

EN ISO 1042, *Laboratory glassware — One-mark volumetric flasks (ISO 1042)*

EN ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170)*

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