

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

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A list of organizations represented on PTI/13 can be obtained on request to its secretary.

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Méthode par chromatographie liquide à haute performance
avec détection par réfractométrie différentielle

Mineralölerzeugnisse - Bestimmung von aromatischen
Kohlenwasserstoffgruppen in Mitteldestillaten - HPLC-
Verfahren mit Brechzahl-Detektor

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Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Principle.....	5
5 Reagents and materials	6
6 Apparatus	6
7 Sampling.....	7
8 Apparatus preparation	7
9 Calibration	9
10 Procedure	11
11 Calculation.....	12
12 Expression of results	13
13 Precision.....	14
14 Test report	14
Annex A (informative) Column selection and use.....	15
Bibliography.....	16

Foreword

This document (EN 12916:2006) 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of an identical text or by endorsement, at the latest by November 2006, and conflicting national standards shall be withdrawn at the latest by November 2006.

This document supersedes EN 12916:2000.

The method has been updated and improved in the sense that:

- a method without back-flush is prescribed resulting in simplicity of the instrument;
- the integration of aromatic hydrocarbon types has been better defined (definition of cut times);
- fluorene is used as calibrant for the determination of aromatic hydrocarbons content instead of 1-methylnaphthalene in order to minimize the bias on the di-aromatic hydrocarbons content between the former method and this version;
- diesel fuels containing FAME up to 5 % (V/V) are included in the scope of the method and the interferences between FAME and tri+-aromatic hydrocarbons do not exist any more;
- The precision of the method has been re-calculated using data from a new inter-laboratory test programme. The precision statement for % (*m/m*) PAHs, as defined by EN 590: 2004 [1], is now included.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, 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.

1 Scope

This European Standard specifies a test method for the determination of the content of mono-aromatic, di-aromatic and tri+-aromatic hydrocarbons in diesel fuels that may contain fatty acid methyl esters (FAME) up to 5 % (V/V) and petroleum distillates in the boiling range from 150 °C to 400 °C. 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 may interfere in the determination; mono-alkenes do not interfere, but conjugated di-alkenes and polyalkenes, if present, may do so.

The precision statement of the test method has been established for diesel fuels with and without FAME blending components, with a mono-aromatic content in the range from 6 % (m/m) to 30 % (m/m), a di-aromatic content from 1 % (m/m) to 10 % (m/m), a tri+-aromatic content from 0 % (m/m) to 2 % (m/m), a polycyclic aromatic content from 1 % (m/m) to 12 % (m/m), and a total aromatic content from 7 % (m/m) to 42 % (m/m).

NOTE 1 For the purpose of this European Standard, the terms “% (m/m)” and “% (V/V)” are used to represent the mass fraction, and the volume fraction 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 may or may not be representative of the aromatics present in the sample. Alternative techniques and test methods may classify and quantify individual aromatic hydrocarbon types differently.

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

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 14214, *Automotive fuels – Fatty acid methyl esters (FAME) for diesel engines – Requirements and test methods*

EN ISO 1042, *Laboratory glassware – One-mark volumetric flasks (ISO 1042:1998)*

EN ISO 3170, *Petroleum liquids – Manual sampling (ISO 3170:2004)*

EN ISO 3171, *Petroleum liquids – Automatic pipeline sampling (ISO 3171:1988)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
non-aromatic hydrocarbon
 compound having a shorter retention time on the specified polar column than the majority of mono-aromatic hydrocarbons