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Petroleum industry and products - Determination of composition of refinery heating gas and calculation of carbon content and calorific value - Gas chromatography method

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**Petroleum industry and products - Determination of
composition of refinery heating gas and calculation of
carbon content and calorific value - Gas chromatography
method**

Industries et produits pétroliers - Détermination de la
composition des gaz combustibles de raffinerie, de leur
pouvoir calorifique et de leur teneur en carbone -
Méthode par chromatographie en phase gazeuse

Mineralölindustrie und -produkte - Bestimmung der
Zusammensetzung von Heizgas für Raffinerien und
Berechnung des Kohlenstoffgehaltes und des
Heizwertes - Gaschromatographisches Verfahren

This European Standard was approved by CEN on 24 December 2021.

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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: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 15984:2022) 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of an identical text or by endorsement, at the latest by August 2022, and conflicting national standards shall be withdrawn at the latest by August 2022.

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 15984:2017.

This revision contains a new informative Annex with estimated precision data for selected components in refinery gas.

This document is based on a DIN Standard [5] with the same scope.

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, Turkey and the United Kingdom.

EN 15984:2022 (E)

1 Scope

This document defines a gas chromatographic analysis for the determination of the composition of fuel gases, as used in refinery heating gas. These results are used to calculate the carbon content and the lower calorific value.

With this gas chromatographic analysis, an overall of 23 refinery heating gas components are determined in concentrations as typically found in refineries (see Table 1 for further details).

Water is not analysed. The results represent dry gases.

NOTE 1 Depending on the equipment used, there is a possibility to determine higher hydrocarbons as well.

NOTE 2 For the purposes of this document, the terms “% (V/V)” is used to represent the volume fraction (φ).

IMPORTANT — 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.

2 Normative references

There are no normative references in this document.

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

This document defines a procedure that is used to determine all components that are present in a typical refinery heating gas, as indicated in Table 1.

NOTE The composition range in which each component can be analyzed does depend on the actual sample composition as higher amounts of a certain component can affect the detection range of other components eluting close by. The general ranges which apply to all the individual components are:

- hydrocarbons from 0,01 (mol/100 mol) up to 100 (mol/100 mol);
- non-condensable gases from 0,02 (mol/100 mol) up to 100 (mol/100 mol);
- for hydrogen sulfide a range between 0,1 (mol/100 mol) up to 10 (mol/100 mol) has been found applicable.

Three different analysis systems are necessary; they may be built in three separate gas chromatographs, or be integrated into one.

Depending on the configuration, hydrocarbons with more than five carbon atoms are reported as a sum parameter. The composition of the refinery heating gas is used to calculate the carbon content and the calorific value. A typical procedure is described hereafter. A configuration is acceptable when the determination results in the precision as described in Clause 11.