

Natural gas — Determination of composition with defined uncertainty by gas chromatography —

Part 2: Measuring-system characteristics and statistics for processing of data

The European Standard EN ISO 6974-2:2002 has the status of a
British Standard

ICS 75.060

National foreword

This British Standard is the official English language version of EN ISO 6974-2:2002. It is identical with ISO 6974-2:2001.

The UK participation in its preparation was entrusted to Technical Committee PTI/15, Natural gas and gas analysis, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, the EN ISO title page, the EN ISO foreword page, the ISO title page, page ii to v, a blank page, pages 1 to 25 and a back cover.

The BSI copyright date displayed in this document indicates when the document was last issued.

Amendments issued since publication

Amd. No.	Date	Comments
13855	15 July 2002	Implementation of the European Standard

This British Standard, having been prepared under the direction of the Sector Committee for Materials and Chemicals, was published under the authority of the Standards Committee and comes into effect on 15 April 2001

© BSI 15 July 2002

ISBN 0 580 36970 6

English version

Natural gas - Determination of composition with defined uncertainty by gas chromatography - Part 2: Measuring-system characteristics and statistics for processing of data (ISO 6974-2:2001)

Gaz naturel - Détermination de la composition avec une incertitude définie par chromatographie en phase gazeuse - Partie 2: Caractéristiques du système de mesure et statistiques pour le traitement des données (ISO 6974-2:2001)

Erdgas - Bestimmung der Zusammensetzung mit definierter Unsicherheit durch Gaschromatographie - Teil 2: Messsystem charakteristiken und Statistiken für die Datenverarbeitung (ISO 6974-2:2001)

This European Standard was approved by CEN on 5 January 2002.

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 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.



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CORRECTED 2002-04-24

Foreword

The text of the International Standard from Technical Committee ISO/TC 193, 'Natural gas' of the International Organization for Standardization (ISO) has been taken over as a European Standard by the Technical Board of CEN.

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 2002, and conflicting national standards shall be withdrawn at the latest by September 2002.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

NOTE Normative references to International Standards are listed in annex ZA (normative).

INTERNATIONAL STANDARD

ISO
6974-2

First edition
2001-02-01

Natural gas — Determination of composition with defined uncertainty by gas chromatography —

Part 2: Measuring-system characteristics and statistics for processing of data

*Gaz naturel — Détermination de la composition avec une incertitude
définie par chromatographie en phase gazeuse —*

*Partie 2: Caractéristiques du système de mesure et statistiques pour le
traitement des données*



Reference number
ISO 6974-2:2001(E)

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 6974 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 6974-2 was prepared by Technical Committee ISO/TC 193, *Natural gas*, Subcommittee SC 1, *Analysis of natural gas*.

This part as well as the other five parts of ISO 6974 cancel and replace ISO 6974:1984 which specified only one method.

ISO 6974 consists of the following parts, under the general title *Natural gas — Determination of composition with defined uncertainty by gas chromatography*:

- *Part 1: Guidelines for tailored analysis*
- *Part 2: Measuring-system characteristics and statistics for processing of data*
- *Part 3: Determination of hydrogen, helium, oxygen, nitrogen, carbon dioxide and hydrocarbons up to C₈ using two packed columns*
- *Part 4: Determination of nitrogen, carbon dioxide and C₁ to C₅ and C₆₊ hydrocarbons for a laboratory and on-line measuring system using two columns*
- *Part 5: Determination of nitrogen, carbon dioxide and C₁ to C₅ and C₆₊ hydrocarbons for a laboratory and on-line process application using three columns*
- *Part 6: Determination of hydrogen, helium, oxygen, nitrogen, carbon dioxide and hydrocarbons up to C₈ using three capillary columns*

Annexes A, B and C of this part of ISO 6974 are for information only.

Introduction

This part of ISO 6974 describes the data processing for the “tailored” analysis of natural gas.

This part is to be used in conjunction with part 1 of ISO 6974 which gives the guidelines for “tailored” analysis.

Any method of analysis, either one of those in part 3 of ISO 6974 and subsequent parts or another method of choice can only be applied in conjunction with parts 1 and 2 of ISO 6974.

The calculation of the composition of the gas using response curves, a working-reference gas mixture and relative response factors are described in part 1 of ISO 6974, while the elaboration of these formulae is described in this part of ISO 6974.

The working-reference gas mixture and the gas sample are analysed with the same analytical system under the same set of conditions. Components not measured by this method will influence the accuracy of the method and should therefore be known.

If no working-reference gas mixture is used for the regular calibration of the analytical system, a number of equations given in this part of ISO 6974 will change. Such changes are indicated for each of these equations.

Once the working ranges of the components have been defined, an evaluation is carried out to determine whether components are to be considered as:

- main components or groups of components to be analysed using direct measurement (directly measured components);
- components or groups of components to be analysed using indirect measurement, as a function of a different, reference component in the calibration gas (indirectly measured components);
- components that are not measured and whose mole fraction can be assumed to be constant (components not measured).

The sum of the mole fractions of the main components, the indirect components and the fixed components is equal to 1.

Natural gas — Determination of composition with defined uncertainty by gas chromatography —

Part 2: Measuring-system characteristics and statistics for processing of data

1 Scope

This part of ISO 6974 describes the data processing for the tailored analysis of natural gas. It includes the determination of the measuring system characteristics and the statistical approach to data handling and error calculation with the aim of defining the uncertainty in the mole fractions of the component measured.

This part of ISO 6974 is only applicable in conjunction with part 1 of ISO 6974.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 6974. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 6974 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6974-1, *Natural gas — Determination of composition with defined uncertainty by gas chromatography — Part 1: Guidelines for tailored analysis.*

ISO 6976, *Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition.*

3 Terms and definitions

For the purposes of this part of ISO 6974, the following terms and definitions apply.

3.1 response

output signal of the measuring system for a component that is measured as peak area or peak height

NOTE Response is expressed in counts.

3.2 uncertainty

estimate attached to a measurement result which characterizes the range of values within which the true value is asserted to lie

NOTE In general, the uncertainty of measurements comprises many components. Some of these components may be estimated on the basis of statistical distribution of the results of series of measurements and can be characterized by experimental standard deviation. The estimates of other components can only be based on experience or other information.