

Natural gas — Guidelines to traceability in analysis

The European Standard EN ISO 14111:1999 has the status of a British Standard

ICS 75.060

National foreword

This British Standard is the English language version of EN ISO 14111:1999. 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 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, pages i and ii, the EN ISO title page, page 2, the ISO title page, pages ii to iv, pages 1 to 24 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments
10655	December 1999	Implementation of the European Standard

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on 15 September 1997

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English version

Natural gas — Guidelines to traceability in analysis

(ISO 14111:1997)

Gaz naturel — Lignes directrices pour la
traçabilité en analyse
(ISO 14111:1997)

Erdgas — Leitlinien für die Rückführbarkeit in
der Analytik
(ISO 14111:1997)

This European Standard was approved by CEN on 3 March 1999.

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 Central Secretariat 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 Central Secretariat 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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

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 CEN/CS.

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 1999, and conflicting national standards shall be withdrawn at the latest by September 1999.

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, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 14111:1997 has been approved by CEN as a European Standard without any modification.

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

INTERNATIONAL STANDARD

ISO
14111

First edition
1997-03-15

Natural gas — Guidelines to traceability in analysis

Gaz naturel — Lignes directrices pour la traçabilité en analyse



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Descriptors: Natural gas, gas analysis, traceability, general conditions.

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.

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.

International Standard ISO 14111 was prepared by Technical Committee ISO/TC 193, *Natural gas*, Subcommittee SC 1, *Analysis of natural gas*.

Annex A to Annex C of this International Standard are for information only.

Introduction

At a time when assurances of measurement accuracy in natural-gas analyses are increasingly being sought, every analytical chemist responsible for the design and operation of systems used in such analyses needs to be aware of, and adopt, suitable means by which he or she will be able to provide these assurances. This implies that the analyst must employ validated methods in which each result is securely linked, through a series of reference materials (reference gas mixtures), to accepted metrological standards. The formal structure which the analyst creates in doing this constitutes what is called a traceability chain. Only by this means will the analyst be able to secure and support a proper estimate of measurement accuracy (uncertainty).

This seemingly simple concept is elaborated in considerable detail in this International Standard. The practical considerations involved in the establishment of a satisfactory traceability chain give rise to challenging problems, particularly in natural-gas analysis, but relevant and useful advice is provided.

At present, traceability of measurement is universally defined through the existence of unbroken calibration chains ending at the level of international or national measurement standards realizing appropriate SI units. This concept originates from the field of physical metrology, where it has been implemented with apparent success. Transfer of the metrological scheme to chemical analysis and other domains in the field of testing is, however, a highly difficult task, for which standard methods are not yet available. Therefore it is not possible, at present, to standardize the implementation of measurement traceability in natural-gas analysis, or in other areas of chemical analysis.

For the reasons indicated above, this International Standard does not give any specific traceability protocols. Instead, its purpose is to

- clarify fundamental concepts involved in chemical traceability;
- identify basic problems in the application of metrology in chemistry;
- indicate feasible solutions on a reference material basis;
- assist in the design of practical implementations using reference gas mixtures;
- serve as a reference document for the application of the traceability concept in other International Standards for natural-gas analysis.

1 Scope

This International Standard provides general guidelines on the implementation and application of traceability concepts in the analysis of natural gas. Its purpose is to lay down the foundations for the development of specific traceability protocols in other International Standards for natural-gas analysis.

NOTE Besides the field of natural-gas analysis, this International Standard could also be useful as a guidance document in other areas of gas analysis and in related fields such as air quality measurement, vehicle emission monitoring and reference-gas mixture preparation.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3534-1:1993, *Statistics — Vocabulary and symbols — Part 1: Probability and general statistical terms*.

ISO 5168:—, *Measurement of fluid flow — Evaluation of uncertainties*¹⁾.

ISO 5725-1:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 1: General principles and definitions*.

ISO 5725-2:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*.

ISO 5725-3:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 3: Intermediate measures of the precision of a measurement method*.

ISO 5725-4:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 4: Basic methods for the determination of the trueness of a standard measurement method*.

ISO 5725-6:1994, *Accuracy (trueness and precision) of measurement methods and results — Part 6: Use in practice of accuracy values*.

ISO 6142:1981, *Gas analysis — Preparation of calibration gas mixtures — Weighing methods* (including addendum 1).

¹⁾ To be published. (Revision of ISO 5168:1978)