

Natural gas - Performance evaluation for on-line analytical systems

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analytical systems

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 10723:2003 sisaldab Euroopa standardi EN ISO 10723:2002+AC:2004 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 18.02.2003 ja selle kohta on avaldatud teade Eesti standardiorganisatsiooni ametlikus väljaandes.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 10723:2003 consists of the English text of the European standard EN ISO 10723:2002+AC:2004.</p> <p>This document is endorsed on 18.02.2003 with the notification being published in the official publication of the Estonian national standardisation organisation.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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<p>Käsitlusala:</p> <p>This International Standard specifies a method of determining whether an analytical system for natural gas is satisfactory, on the assumptions that a) the analytical requirement has been clearly and unambiguously defined, for the range and uncertainty of component concentration measurements, and the uncertainty of properties which may be calculated from these measurements;</p>	<p>Scope:</p> <p>This International Standard specifies a method of determining whether an analytical system for natural gas is satisfactory, on the assumptions that a) the analytical requirement has been clearly and unambiguously defined, for the range and uncertainty of component concentration measurements, and the uncertainty of properties which may be calculated from these measurements;</p>
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Hinnagrupp S

ICS 75.060

English version

Natural gas

Performance evaluation for on-line analytical systems
(ISO 10723 : 1995)

Gaz naturel – Évaluation des performances des systèmes d'analyse en ligne (ISO 10723 : 1995)

Erdgas – Bewertung der Leistungsfähigkeit von On-line-Analysesystemen (ISO 10723 : 1995)

This European Standard was approved by CEN on 2002-08-19.

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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.

The European Standards exist 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, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

CEN

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

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Foreword

International Standard

ISO 10723 : 1995 Natural gas – Performance evaluation for on-line analytical systems, which was prepared by ISO/TC 193 'Natural gas' of the International Organization for Standardization, has been adopted by CEN/CMC as a European Standard.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, and conflicting national standards withdrawn, by March 2003 at the latest.

In accordance with the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard:

Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

Endorsement notice

The text of the International Standard ISO 10723 : 1995 was approved by CEN as a European Standard without any modification.

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Introduction

This International Standard describes a method for evaluating the performance of analytical systems intended for the analysis of natural gas. Natural gas is assumed to consist predominantly of methane, with other saturated hydrocarbons and non-combustible gases.

Performance evaluation makes no assumptions about equipment for and/or methodology of analysis, but gives test methods which can be applied to the chosen analytical system, including the method, equipment and sample handling.

This International Standard contains an informative annex (annex A) which shows the application for an on-line gas chromatographic system which, as described, is assumed to have a response/concentration relationship for all components which is represented by a straight line through the origin. It contains two additional informative annexes (annexes B and C).

1 Scope

This International Standard specifies a method of determining whether an analytical system for natural gas is satisfactory, on the assumptions that

- a) the analytical requirement has been clearly and unambiguously defined, for the range and uncertainty of component concentration measurements, and the uncertainty of properties which may be calculated from these measurements;
- b) the analytical and calibration procedures have been fully described;
- c) the method is intended to be applied to gases having compositions which vary over ranges normally found in transmission and distribution networks.

If the performance evaluation shows the system to be unsatisfactory, all the stages, such as

- the analytical requirement;
- the analytical procedure;
- the choice of equipment;
- the choice of calibration gas;
- the calculation procedure;

must be re-examined in the light of the test data to assess where improvements can be obtained.

This International Standard is applicable to analytical systems which give the component concentrations and resulting uncertainties. With the present state of knowledge, the method chosen is likely to be gas chromatography.

Performance evaluation of an analytical system should be performed during installation, then at regular intervals, according to the application, and/or whenever any critical component of the analytical system is changed or replaced.

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 6142:1981, *Gas analysis — Preparation of calibration gas mixtures — Weighing methods*.

ISO 6974:1984, *Natural gas — Determination of hydrogen, inert gases and hydrocarbons up to C8 — Gas chromatographic method*.

ISO 6976:1995, *Natural gas — Calculation of calorific values, density, relative density and Wobbe index from composition*.

ISO 7504:1985, *Gas analysis — Vocabulary*.

3 Principle

The analytical system is set up according to the instructions so as to carry out the specified compositional analysis. The effectiveness of the system is demonstrated by analysing test gases with compositions covering a range rather wider than that for which the system has been specified.

Test gases prepared according to an appropriate standard are injected into the analyser to test:

- a) the ability of the system to measure the components specified in the analytical method (system efficiency);
- b) the repeatability of measurement of individual components over their specified ranges;
- c) the relationship between response and concentration of individual components over their specified ranges;
- d) the absence of interference between components at different concentration ratios.

The tests required for b) and c) above are conducted over intervals of time comparable with the normal period of use between regular calibrations. Because a number of parameters which can influence the analytical performance may vary on a day-to-day basis (barometric pressure variations are a case in point), it is recommended that the tests be repeated on at least three separate intervals, so that occasional inconsistencies may be recognized. However, it is acknowledged that there are circumstances (such as testing analysers installed in remote locations) where only a single set of tests can be obtained.

The results of the tests are analysed to assess analyser performance with respect to bias, repeatability and interference. The repeatability test b) shows the random error associated with the measurement of a component and whether this varies with concentration. The response function c) shows the likelihood of bias error arising from different component concentrations in the calibration standard and sample; bias can also result from component interference d).

Accuracy of measurement is not included in this list, since analytical accuracy is fundamentally and principally controlled by the accuracy with which the calibration gas composition is known. The procedures described in this International Standard allow a judgement as to the ability of the analytical method to provide accurate results if used with an accurate and appropriate calibration gas.

4 Suitability of analytical systems

The analytical system to be evaluated shall satisfy the following criteria.

- a) The analytical requirement has been carefully defined, for the range and uncertainty of component concentration measurement, or of physical or chemical property calculation, or of both.
- b) The analytical and calibration procedures, whether manual or automated, laboratory or process, have been fully described, preferably following appropriate interlaboratory testing. Changes in details of the method are not permissible during the series of tests. If, at the end of the tests, it is clear that the method fails to provide the desired performance, it shall be modified suitably and the entire test procedure reapplied.