Natural gas - Determination of composition and associated uncertainty by gas chromatography - Part 2: Uncertainty calculations (ISO 6974-2:2012)

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NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 6974-2:2012 sisaldab Euroopa standardi EN ISO 6974-2:2012 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 6974-2:2012 consists of the English text of the European standard EN ISO 6974-2:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 15.05.2012.	Date of Availability of the European standard is 15.05.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

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Natural gas - Determination of composition and associated uncertainty by gas chromatography - Part 2: Uncertainty calculations (ISO 6974-2:2012)

Gaz naturel - Détermination de la composition et de l'incertitude associée par chromatographie en phase gazeuse - Partie 2: Calculs d'incertitude (ISO 6974-2:2012)

Erdgas - Bestimmung der Zusammensetzung und der zugehörigen Unsicherheit durch Gaschromatographie - Teil 2: Unsicherheitsberechnungen (ISO 6974-2:2012)

This European Standard was approved by CEN on 14 May 2012.

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Foreword

This document (EN ISO 6974-2:2012) has been prepared by Technical Committee ISO/TC 193 "Natural gas".

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of an identical text or by endorsement, at the latest by November 2012, and conflicting national standards shall be withdrawn at the latest by November 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Endorsement notice

The text of ISO 6974-2:2012 has been approved by CEN as a EN ISO 6974-2:2012 without any modification.

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Introduction

ISO 6974 describes methods of analysis of natural gas and methods for calculating component mole fractions and uncertainties. ISO 6974 (all parts) is intended for the measurement of H_2, He, O_2, N_2, CO_2 and hydrocarbons, either as individual components or as a group, for example all hydrocarbons above C_5, defined as C_{6+}. This approach is suitable for a range of end applications, including calibrating gas mixtures and providing natural gas composition and uncertainty data to be used in the calculation of calorific value and other additive physical properties of the gas. Details of these end applications are provided in ISO 6974-3 and subsequent parts of ISO 6974.

ISO 6974-1 gives guidelines for calculating the mole composition of natural gas, determined using one of the gas chromatographic methods described in ISO 6974-3 and subsequent parts of ISO 6974. ISO 6974-1 also describes all the essential steps for setting up an analysis, including outlining the structure of the analysis, defining the working ranges and establishing the analytical procedure.

This part of ISO 6974 describes the steps required to calculate the uncertainty of the component mole fractions of natural gas determined using gas chromatography.

ISO 6974-3 and subsequent parts of ISO 6974 describe different gas chromatographic methods. These methods cover both daily practice in the laboratory and on-line field applications. ISO 6974-1:2012, Annex A, provides a comparison of the characteristics of the analytical methods described in ISO 6974-3 and subsequent parts of ISO 6974.

It is intended that this part of ISO 6974 be used in conjunction with ISO 6974-1 and a method of analysis, e.g. ISO 6974-3 or subsequent parts of ISO 6974.

ISO 6974-1:2012, 5.5, describes the conventional normalization approach for calculating processed mole fractions from raw mole fractions. When conventional normalization is used for multiple operation methods without bridging, the uncertainties of the calculated mole fractions will be conservative. If a more accurate assessment of uncertainty is required, an alternative approach to normalization, using the generalized least squares (GLS) method, can be used; this is described in ISO 6974-1:2012, Annex B. Further alternative approaches are available for calculating processed mole fractions, including methane-by-difference (see ISO 6974-1:2012, Annex C) and data harmonization (see Reference [1]).

Natural gas — Determination of composition and associated uncertainty by gas chromatography —

Part 2: Uncertainty calculations

1 Scope

This part of ISO 6974 describes the process required to determine the uncertainty associated with the mole fraction for each component from a natural gas analysis in accordance with ISO 6974-1.

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.

ISO 6974-1:2012, *Natural gas — Determination of composition and associated uncertainty by gas chromatography — Part 1: General guidelines and calculation of composition*

ISO/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 6974-1 apply.

4 Symbols

4.1 Symbols

b_z parameters of the regression function ($z = 0$, 1, 2 or 3)

$\bar{b}_z$ mean parameters of the regression function (in “mean normalization” method)

C_i sensitivity coefficient

k coverage factor

K relative response factor with respect to the reference component

n_i total number of components (direct plus indirect, but excluding “other components”)

n_j total number of gas standards or mixtures

n_l total number of injections (and therefore total number of responses)

s standard deviation

T total mole fraction of all raw components