

STN	Zemný plyn. Stanovenie zloženia a priradenej neistoty plynovou chromatografiou. Časť 5: Izotermická metóda pre dusík, oxid uhličitý, uhľovodíky C1 až C5 a C6 spolu s vyššími uhľovodíkmi (ISO 6974-5: 2014).	STN EN ISO 6974-5 38 6111
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Natural gas - Determination of composition and associated uncertainty by gas chromatography - Part 5: Isothermal method for nitrogen, carbon dioxide, C1 to C5 hydrocarbons and C6+ hydrocarbons (ISO 6974-5:2014)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/15

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English Version

Natural gas - Determination of composition and associated uncertainty by gas chromatography - Part 5: Isothermal method for nitrogen, carbon dioxide, C1 to C5 hydrocarbons and C6+ hydrocarbons (ISO 6974-5:2014)

Gaz naturel - Détermination de la composition et de l'incertitude associée par chromatographie en phase gazeuse - Partie 5: Méthode isotherme pour l'azote, le dioxyde de carbone, les hydrocarbures C1 à C5 et C6+ (ISO 6974-5:2014)

Erdgas - Bestimmung der Zusammensetzung und der zugehörigen Unsicherheit durch Gaschromatographie - Teil 5: Isothermes Verfahren für Stickstoff, Kohlenstoffdioxid, C1- bis C5-Kohlenwasserstoffe und C6+-Kohlenwasserstoffe (ISO 6974-5:2014)

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COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN ISO 6974-5:2014) 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of an identical text or by endorsement, at the latest by January 2015, and conflicting national standards shall be withdrawn at the latest by January 2015.

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Endorsement notice

The text of ISO 6974-5:2014 has been approved by CEN as EN ISO 6974-5:2014 without any modification.

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

**Part 5:
Isothermal method for nitrogen,
carbon dioxide, C₁ to C₅ hydrocarbons
and C₆₊ hydrocarbons**

Gaz naturel — Détermination de la composition et de l'incertitude associée par chromatographie en phase gazeuse —

Partie 5: Méthode isotherme pour l'azote, le dioxyde de carbone, les hydrocarbures C₁ à C₅ et C₆₊





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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 www.iso.org/directives.

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 193, *Natural Gas*, Subcommittee SC 1, *Analysis of Natural Gas*.

This second edition cancels and replaces the first edition (ISO 6974-5:2000).

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

- *Part 1: General guidelines and calculation of composition*
- *Part 2: Uncertainty calculations*
- *Part 3: Determination of hydrogen, helium, oxygen, nitrogen, carbon dioxide and hydrocarbons up to C₈ using two capillary columns and one packed column*
- *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: Isothermal method for nitrogen, carbon dioxide, C₁ to C₅ hydrocarbons and C₆₊ hydrocarbons*
- *Part 6: Determination of helium, oxygen, nitrogen, carbon dioxide and C₁ to C₈ hydrocarbons using three capillary columns*

Introduction

This part of ISO 6974 describes a method for the analysis of natural gas that is commonly used for online process applications, but can be applied to laboratory instruments. The compositional data obtained are used for the calculation of calorific value, density and Wobbe index.

It is assumed that the natural gas does not contain any oxygen at source and that any oxygen which may be present is due to contamination during sampling.

The primary use of this chromatographic method is the calculation of calorific value (CV) according to ISO 6976. It is based on a column switching technique in which multiple columns, chosen for their separating ability for particular groups of components, are switched under automatic control.

Only one injection is necessary and the first phase of the method involves accelerated backflush of C₆+ (which is measured as a recombined “pseudo component” rather than by the summation of individual component measurements). Lighter components (nitrogen, methane, carbon dioxide and ethane) are stored on the appropriate separating column while the heavier, C₃ to C₅ hydrocarbons are eluted. The lighter components are then separated by redirecting carrier gas on to the appropriate column.

A Thermal Conductivity Detector (TCD) is used for measurement of the above components.

When the method is first set up, the repeatability of measurement is established by repetitive analysis of a cylinder of test gas, commonly a typical natural gas. For each component, a control chart showing the mean value, and the bounds representing 2 and 3 standard deviations, is drawn up. Subsequently, this test gas is analysed after each calibration of the analyser, and the results are compared with the data in the control charts. The performance of the analyser is assessed by this procedure.

Any change in the method setup can give rise to differences in component responses and hence (where applied) to calculated uncertainties. In these circumstances fitting data to an existing control chart is not a suitable procedure, and the operations that were undertaken when the method was first set up shall be repeated.

This part of ISO 6974 provides one of the methods that may be used for determining the compositions of natural gas in accordance with ISO 6974-1 and ISO 6974-2.

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

Part 5:

Isothermal method for nitrogen, carbon dioxide, C₁ to C₅ hydrocarbons and C₆₊ hydrocarbons

1 Scope

This part of this International Standard describes a gas chromatographic method for the quantitative determination of the content of nitrogen, carbon dioxide and C₁ to C₅ hydrocarbons individually and a composite C₆₊ measurement, which represents all hydrocarbons of carbon number 6 and above in natural gas samples. It is applicable to the analysis of gases containing constituents within the working ranges given in [Table 1](#).

Table 1 — Component working ranges

Component		Mole fraction	
		%	
		Min.	Max.
Nitrogen	N ₂	0,1	22
Carbon dioxide	CO ₂	0,05	15
Methane	CH ₄	34	100
Ethane	C ₂ H ₆	0,1	23
Propane	C ₃ H ₈	0,05	10
iso-Butane	i-C ₄ H ₁₀	0,01	2,0
n-Butane	n-C ₄ H ₁₀	0,01	2,0
neo-Pentane	neo-C ₅ H ₁₂	0,005	0,35
iso-Pentane	i-C ₅ H ₁₂	0,005	0,35
n-Pentane	n-C ₅ H ₁₂	0,005	0,35
Hexanes +	C ₆₊	0,005	0,35

NOTE 1 The working ranges in [Table 1](#) are those for which the method has been shown to be satisfactory, and are offered for guidance. However, there is no reason why wider ranges should not be used, provided that the successful measurement of such wider ranges has been demonstrated.

NOTE 2 Hydrocarbons above n-pentane are expressed as the “pseudo-component” C₆₊ which is measured as one composite peak and calibrated as such. The properties of C₆₊ are calculated from an extended analysis of the individual C₆ and higher hydrocarbons.

NOTE 3 Oxygen is not a normal constituent of natural gas and would not be expected to be present in gas sampled to an online instrument. If any oxygen is present as a result of air contamination, it will be measured with the nitrogen. The resulting measured (nitrogen + oxygen) value will be in error to a small extent because of the slight difference between the detector responses of oxygen and nitrogen.

NOTE 4 The helium and argon contents are assumed to be sufficiently small and unvarying that they need not be analysed for.

NOTE 5 The gas sample shall not contain any hydrocarbon condensate and/or water.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *Natural gas — Determination of composition and associated uncertainty by gas chromatography — Part 1: General guidelines and calculation of composition*

ISO 6974-2, *Natural gas — Determination of composition and associated uncertainty by gas chromatography — Part 2: Uncertainty calculations*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN