

Second edition
2014-07-15

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₊*



Reference number
ISO 6974-5:2014(E)

© ISO 2014

This is a preview of "ISO 6974-5:2014". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

This is a preview of "ISO 6974-5:2014". [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	2
3 Principle	2
4 Materials	4
5 Apparatus	4
6 Scheme of the configuration	6
7 Procedure	7
7.1 Control of the apparatus.....	7
7.2 Operation of the apparatus.....	8
8 Expression of results	11
8.1 Uncertainty.....	11
8.2 Test report.....	11
Annex A (informative) Example of application	12
Annex B (informative) Procedure for Setting Valve timings and Restrictor Setting	22
Bibliography	24

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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received www.iso.org/patents.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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*

This is a preview of "ISO 6974-5:2014". [Click here to purchase the full version from the ANSI store.](#)

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.