

Gas analysis - Conversion of gas mixture composition data

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EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 14912:2006 sisaldab Euroopa standardi EN ISO 14912:2006 ingliskeelset teksti.</p> <p>Käesolev dokument on jõustatud 20.09.2006 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 14912:2006 consists of the English text of the European standard EN ISO 14912:2006.</p> <p>This document is endorsed on 20.09.2006 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 defines the following quantities commonly used to express the composition of gas mixtures: - mole fraction, - mass fraction, - volume fraction, and - mole concentration, - mass concentration, - volume concentration.</p>	<p>Scope:</p> <p>This International Standard defines the following quantities commonly used to express the composition of gas mixtures: - mole fraction, - mass fraction, - volume fraction, and - mole concentration, - mass concentration, - volume concentration.</p>
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English Version

Gas analysis - Conversion of gas mixture composition data (ISO
14912:2003)

Analyse des gaz - Conversion des données de composition
de mélanges gazeux (ISO 14912:2003)

Gasanalyse - Umrechnung von
Zusammensetzungsangaben für Gasgemische (ISO
14912:2003)

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Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

The text of ISO 14912:2003 has been prepared by Technical Committee ISO/TC 158 "Analysis of gases" of the International Organization for Standardization (ISO) and has been taken over as EN ISO 14912:2006 by Technical Committee CEN/SS N21 "Gaseous fuels and combustible gas", the secretariat of which is held by CMC.

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of an identical text or by endorsement, at the latest by February 2007, and conflicting national standards shall be withdrawn at the latest by February 2007.

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Endorsement notice

The text of ISO 14912:2003 has been approved by CEN as EN ISO 14912:2006 without any modifications.

**Gas analysis — Conversion of gas
mixture composition data**

*Analyse des gaz — Conversion des données de composition de
mélanges gazeux*



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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

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 14912 was prepared by Technical Committee ISO/TC 158, *Analysis of gases*.

Introduction

The objective of gas analysis is to determine the composition of gas mixtures. Gas mixture composition is expressed qualitatively in terms of specified mixture components of interest, called analytes, and the complementary gas. Gas mixture composition is expressed quantitatively by specifying the amount of every analyte in the mixture and the composition of the complementary gas.

For the purpose of specifying the amount of an analyte in a gas mixture, different quantities are in use. This diversity is due to the fact that in different applications different quantities have decisive advantages. Therefore procedures for conversion between different quantities are required.

In cases where these quantities involve the volumes of the analytes or the gas mixture or both, they depend on the state conditions, i.e. pressure and temperature, of the gas mixture. For each of these quantities, procedures for conversion between different state conditions are required.

As a crude approximation, all of the conversions referred to above can be performed on the basis of the Ideal Gas Law. In most cases, however, an accurate conversion has to take into account the real gas volumetric behaviour of the analyte and of the gas mixture. In particular, many conversions require values of the compression factor (or of the density) of the gas mixture.

This International Standard provides formally exact conversion procedures, based on fundamental principles, which fully account for real gas behaviour of pure gases and gas mixtures. In addition to these, approximate procedures for practical applications are described, designed for different levels of accuracy and available data. These approximations are necessary because measured gas mixture compression factors (or densities) are rarely available and therefore have to be estimated from component data. Uncertainty estimates are given which result from combining approximations in the conversion procedures with the uncertainties of the input data. Where conversions require real-gas volumetric data of pure gases or gas mixtures, these are expressed by compression factors. As equivalents, density data could be converted into compression factor data.

Gas analysis — Conversion of gas mixture composition data

1 Scope

This International Standard defines the following quantities commonly used to express the composition of gas mixtures:

- mole fraction,
- mass fraction,
- volume fraction,

and

- mole concentration,
- mass concentration,
- volume concentration.

For these quantities of composition, this International Standard provides methods for

- conversion between different quantities, and
- conversion between different state conditions.

Conversion between different quantities means calculating the numerical value of an analyte content in terms of one of the quantities listed above from the numerical value of the same analyte content, at the same pressure and temperature of the gas mixture, given in terms of another of these quantities. Conversion between different state conditions means calculating the numerical value of an analyte content, in terms of one of the quantities listed above, under one set of state conditions from the numerical value of the same quantity under another set of state conditions, i.e. pressure and temperature, of the gas mixture. Gas mixture composition can be converted simultaneously between different quantities of composition and different state conditions by combination of the two types of conversion.

This International Standard is applicable only to homogeneous and stable gas mixtures. Therefore any state conditions (pressure and temperature) considered need to be well outside the condensation region of the gas mixture and that of each of the specified analytes (see Annex A).

2 Terms and definitions

For the purpose of this document, the following terms and definitions apply.

NOTE See also References [1] and [2] in the Bibliography.

2.1 Quantities for the expression of gas mixture composition

NOTE Further information concerning the terms defined in this subclause is given in 4.1.