

Gas analysis - Comparison methods for determining and checking the composition of calibration gas mixtures

Gas analysis - Comparison methods for determining and checking the composition of calibration gas mixtures

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 6143:2006 sisaldab Euroopa standardi EN ISO 6143:2006 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 6143:2006 consists of the English text of the European standard EN ISO 6143:2006.</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 provides methods for - determining the composition of a calibration gas mixture by comparison with appropriate reference gas mixtures, - calculating the uncertainty of the composition of a calibration gas mixture in relation to the known uncertainty of the composition of the reference gas mixtures with which it was compared,</p>	<p>Scope:</p> <p>This International Standard provides methods for - determining the composition of a calibration gas mixture by comparison with appropriate reference gas mixtures, - calculating the uncertainty of the composition of a calibration gas mixture in relation to the known uncertainty of the composition of the reference gas mixtures with which it was compared,</p>
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Võtmesõnad:

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English Version

Gas analysis - Comparison methods for determining and
checking the composition of calibration gas mixtures (ISO
6143:2001)

Analyse des gaz - Méthodes comparatives pour la
détermination et la vérification de la composition des
mélanges de gaz pour étalonnage (ISO 6143:2001)

Gasanalyse - Vergleichsverfahren zur Bestimmung und
Überprüfung der Zusammensetzung von
Kalibriergasgemischen (ISO 6143:2001)

This European Standard was approved by CEN on 21 July 2006.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

The text of ISO 6143:2001 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 6143:2006 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.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Endorsement notice

The text of ISO 6143:2001 has been approved by CEN as EN ISO 6143:2006 without any modifications.

**Gas analysis — Comparison methods for
determining and checking the composition
of calibration gas mixtures**

*Analyse des gaz — Méthodes comparatives pour la détermination et la
vérification de la composition des mélanges de gaz pour étalonnage*



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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 6143 was prepared by Technical Committee ISO/TC 158, *Analysis of gases*, to cancel and replace the first edition (ISO 6143:1981), of which the methods for the design and evaluation of calibrations of analytical systems have been updated and a method for estimating the uncertainty of the composition of calibration gas mixtures has been added. It also cancels and replaces ISO 6711:1981, of which entirely new methods for checking the composition of calibration gases have been specified, thus replacing the method which is no longer in use.

Annex A forms a normative part of ISO 6143. Annexes B and C are for information only.

Introduction

In gas analysis, calibration of analytical systems, as specified in the first edition of ISO 6143, has largely been confined to the determination of a straight line through the origin, or of a straight-line segment, using only the minimum number of calibration standards (one for a straight line through the origin, two for a line segment). The approach adopted in the revision, relating to calibration as well as to uncertainty evaluation, goes far beyond this simple scheme by

- including non-linear response curves and/or functions,
- replacing interpolation by regression,
- taking into account the uncertainty on the calibration standards,
- including validation of calculated response curves and/or functions,
- calculating uncertainties by uncertainty propagation.

As a consequence of adopting non-linear response models, advanced regression techniques (errors in both variables) and uncertainty propagation, the main calculation procedures can only be performed on a computer, using a specific program. Such a program is available (see annex C). As an alternative, sufficient information is given in the document to enable the user to develop a program on his own.

Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures

1 Scope

This International Standard provides methods for

- determining the composition of a calibration gas mixture by comparison with appropriate reference gas mixtures,
- calculating the uncertainty of the composition of a calibration gas mixture in relation to the known uncertainty of the composition of the reference gas mixtures with which it was compared,
- checking the composition attributed to a calibration gas mixture by comparison with appropriate reference gas mixtures,
- comparing the composition of several calibration gas mixtures, e.g. for the purpose of comparing different methods of gas mixture preparation, or for testing consistency among gas mixtures of closely related composition.

NOTE In principle, the method described in this document is also applicable to the analysis of (largely) unknown samples instead of prospective calibration gas mixtures (i.e. gas mixtures which are intended for use as calibration gas mixtures). Such applications, however, require appropriate care and consideration of additional uncertainty components, for example concerning the effect of matrix differences between the reference gases used for calibration and the analysed sample.

2 Terms and definitions

For the purposes of this International Standard, the following terms and definitions apply.

2.1

composition

characteristic of a gas mixture given by the kind and content of each specified mixture component (analyte) and the composition of the complementary gas (matrix)

NOTE In this International Standard, the analyte content is specified as a mole fraction, exclusively. Mole fractions have the advantage of being perfectly independent of the pressure and the temperature of the gas mixture. Therefore their use is recommended. However, for specific measuring systems, other composition measures (e.g. mass concentrations) may be more appropriate. Their use then requires due care concerning the dependence on pressure and temperature.

2.2

comparison method

method for determining the content of a specified gas mixture component (analyte) by measuring an instrumental response

NOTE Comparison of measuring systems requires calibration, in which the relationship between response and analyte content is established. This is achieved by measuring the response to known values of analyte content provided by reference gas mixtures.