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Irish Standard
I.S. EN ISO 6145-9:2010

Gas analysis - Preparation of calibration gas mixtures using dynamic volumetric methods - Part 9: Saturation method (ISO 6145-9:2009)

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 6145-9

December 2010

ICS 71.040.40

English Version

Gas analysis - Preparation of calibration gas mixtures using dynamic volumetric methods - Part 9: Saturation method (ISO 6145-9:2009)

Analyse des gaz - Préparation des mélanges de gaz pour étalonnage à l'aide de méthodes volumétriques dynamiques - Partie 9: Méthode par saturation (ISO 6145-9:2009)

Gasanalyse - Herstellung von Kalibriergasgemischen mit Hilfe von dynamisch-volumetrischen Verfahren - Teil 9: Sättigungsverfahren (ISO 6145-9:2009)

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Contents

Page

Foreword.....3

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Foreword

The text of ISO 6145-9:2009 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 6145-9:2010.

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of an identical text or by endorsement, at the latest by June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

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INTERNATIONAL STANDARD

ISO 6145-9

Second edition
2009-10-01

Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods —

Part 9:
Saturation method

Analyse des gaz — Préparation des mélanges de gaz pour étalonnage à l'aide de méthodes volumétriques dynamiques —

Partie 9: Méthode par saturation

Reference number
ISO 6145-9:2009(E)

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Contents

Page

Foreword iv

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Principle 1

5 Equipment 2
5.1 Set up 2
5.2 Gas preparation 2
5.3 Compatibility of the apparatus 2
5.4 Selection of the apparatus 2
5.5 Pressure measurement 2
5.6 Temperature control 3
5.7 Instrumentation 3
5.8 Purity 4

6 Procedure 4
6.1 Installation 4
6.2 Operation of a direct system 4
6.3 Operation of a closed circulation system 4

7 Uncertainty of measurement 5

Annex A (normative) **Overview of vapour pressure data for various substances** 7

Annex B (informative) **Examples of uncertainty estimations** 11

Bibliography 14

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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 6145-9 was prepared by Technical Committee ISO/TC 158, *Analysis of gases*.

This second edition cancels and replaces the first edition (ISO 6145-9:2001) and ISO 6145-9:2001/Cor 1:2002, which have been technically revised. As Annex B is purely informative, and included as a guide to the methods of calculation of the volume fractions, the numerical examples which are presented in it have been carried forward verbatim from ISO 6145-9:2001 to this updated standard. Although some references have been updated in the present bibliography to the most recent editions, the tables in Annex A have also been reproduced verbatim and are based on data from the earlier editions of the relevant publications (References [3], [4] and [7] to [10] in the Bibliography). In the application of this updated standard, it is firmly recommended that the more recent versions of the publications be consulted, even though it is anticipated that any amendments to the earlier versions will be minor ones. For example, the 15th edition of Reference [4] was published in 1999 and the 2nd edition of Reference [8] was published in 1984.

ISO 6145-9 also cancels and replaces ISO 6147, which has the same subject. In comparison with ISO 6147, ISO 6145-9 gives more detailed information on the use of the apparatus and a clause on the uncertainty of measurement has been added. The estimated uncertainties in the calibration methods and techniques have now been combined in a square-root sum-of-squares manner to form the relative combined standard uncertainty.

ISO 6145 consists of the following parts, under the general title *Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods*:

— *Part 1: Methods of calibration*

— *Part 2: Volumetric pumps*

— *Part 4: Continuous syringe injection method*

— *Part 5: Capillary calibration devices*

— *Part 6: Critical orifices*

— *Part 7: Thermal mass-flow controllers*

— *Part 8: Diffusion method*

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— *Part 9: Saturation method*

— *Part 10: Permeation method*

— *Part 11: Electrochemical generation*

ISO 6145-3, entitled *Periodic injections into a flowing gas stream,* has been withdrawn.

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Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods —

Part 9:
Saturation method

1 Scope

This part of ISO 6145 is one of a series of International Standards dealing with various dynamic volumetric methods used for the preparation of calibration gas mixtures. This part specifies a method for continuous production of calibration gas mixtures containing one or more readily condensable components. A relative expanded uncertainty of measurement, U, obtained by multiplying the relative combined standard uncertainty by a coverage factor $k = 2$, of not greater than ± 1 %, can be obtained using this method.

Unlike the methods presented in the other parts of ISO 6145, the method described in this part does not require accurate measurement of flow rates since flow rates do not appear in the equations for calculation of the volume fraction.

Readily condensable gases and vapours commonly become adsorbed on surfaces, and it is therefore difficult to prepare stable calibration gas mixtures of accurately known composition, containing such components, by means of static methods. In addition, these calibration gas mixtures cannot be maintained under a pressure near the saturation limit without the occurrence of condensation. The saturation method can be employed to prepare mixtures of this type.

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 6143, *Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures*

ISO 7504, *Gas analysis — Vocabulary*

ISO 16664, *Gas analysis — Handling of calibration gases and gas mixtures — Guidelines*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7504 apply.

4 Principle

The vapour pressure of a pure substance in equilibrium with its condensed phase depends on the temperature only. At pressures close to the prevailing barometric pressure, and in the absence of significant

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