Gas analysis - Preparation of calibration gas mixtures using dynamic volumetric methods - Part 11: Electrochemical generation

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Gas analysis - Preparation of calibration gas mixtures using dynamic volumetric methods - Part 11: Electrochemical generation (ISO 6145-11:2005)

Analyse des gaz - Préparation des mélanges de gaz pour étalonnage à l'aide de méthodes volumétriques dynamiques - Partie 11: Génération électrochimique (ISO 6145-11:2005)

Gasanalyse - Herstellung von Kalibriergasgemischen mit Hilfe von dynamisch-volumetrischen Verfahren - Teil 11: Elektrochemische Herstellung (ISO 6145-11:2005)

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Foreword

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Introduction

This part of ISO 6145 is one of a series of standards dealing with the various dynamic volumetric methods used for the preparation of calibration gas mixtures.

Electrochemical gas generation can be used to produce calibration gas mixtures containing calibration components which, because of their corrosive nature or low content, are unlikely to be stable in high-pressure cylinders.

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

Part 11: Electrochemical generation

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1 Scope

This part of ISO 6145 specifies a method for the preparation of calibration gas mixtures by using electrochemical generation of a calibration component and introduction into a complementary gas flow. By alteration of the gas flow or the charge passed through the cell electrolyte, it is possible to change the composition of the gas mixture. The relative expanded uncertainty of the calibration gas content, U, obtained by multiplying the relative combined standard uncertainties by a coverage factor, k = 2, is not greater than 5 %.

The method described in this part of ISO 6145 is intended to be applied to the preparation of calibration gas mixtures in the volume fraction ranges (0,1 to 250) $\times$ 10^{-6}.

NOTE 1 Gases that can be produced by electrochemical generation are oxygen (O_2), hydrogen (H_2), hydrogen cyanide (HCN), hydrogen sulfide (H_2S), chlorine (Cl_2), bromine (Br_2), chlorine dioxide (ClO_2), ammonia (NH_3), nitric oxide (NO), nitrogen (N_2), carbon dioxide (CO_2), phosphine (PH_3), arsine (AsH_3) and ozone (O_3).

NOTE 2 The merits of the method are that a stable calibration gas mixture can be quickly prepared within minutes.

NOTE 3 Gas blending systems based on electrochemical generation and thermal mass flow controllers, with the facility of computerization and automatic control, are commercially available. An example is given in Annex A.

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 6145-1, *Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods — Part 1: Methods of calibration*

ISO 6145-7:2001, *Gas analysis — Preparation of calibration gas mixtures using dynamic volumetric methods — Part 7: Thermal mass-flow controllers*

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