

**Gas analysis - Preparation of calibration gas mixtures using dynamic volumetric methods - Part 4: Continuous syringe injection method**

## EESTI STANDARDI EESSÕNA

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<p>Käesolev Eesti standard EVS-EN ISO 6145-4:2008 sisaldab Euroopa standardi EN ISO 6145-4:2008 ingliskeelset teksti.</p> <p>Standard on kinnitatud Eesti Standardikeskuse 25.09.2008 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 27.06.2008.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 6145-4:2008 consists of the English text of the European standard EN ISO 6145-4:2008.</p> <p>This standard is ratified with the order of Estonian Centre for Standardisation dated 25.09.2008 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.</p> <p>Date of Availability of the European standard text 27.06.2008.</p> <p>The standard is available from Estonian standardisation organisation.</p>
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English Version

Gas analysis - Preparation of calibration gas mixtures using  
dynamic volumetric methods - Part 4: Continuous syringe  
injection method (ISO 6145-4:2004)

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Kontinuierliches Spritzen-Injektionsverfahren (ISO 6145-  
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## Foreword

The text of ISO 6145-4:2004 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 6145-4:2008 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of an identical text or by endorsement, at the latest by February 2009, and conflicting national standards shall be withdrawn at the latest by February 2009.

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## Introduction

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

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

## Part 4: Continuous syringe injection method

### 1 Scope

This part of ISO 6145 specifies a method for continuous production of calibration gas mixtures, containing two or more components, from pure gases or other gas mixtures by continuous injection of the calibration component(s) into a complementary gas stream by means of a syringe.

If pre-mixed gases are used instead of pure gases (see Annex A), much lower volume fractions can be obtained. The volume flow rates, from which the volume fractions are determined, can be calculated from the individual flow rates and can be independently measured by a suitable method given in ISO 6145-1.

The merits of the method are that a substantial quantity of the gas mixture can be prepared on a continuous basis and that multi-component mixtures can be prepared almost as readily as binary mixtures if the appropriate number of syringes is utilized, or if the syringe already contains a multi-component mixture of known composition. This method also provides a convenient means for increasing the volume fraction of the calibration component in the mixture in small steps. It is therefore a useful method for evaluation of other characteristics of gas analysers, such as minimum detection limit and dead zone, as well as accuracy. The relative expanded uncertainty in the volume fraction obtainable for a binary mixture (at a coverage factor of 2) is 5 % and the range of applicability is  $10^{-5}$  to  $10^{-2}$ .

### 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*

### 3 Principle

The calibration component, either in the gaseous or liquid phase, is displaced from a syringe, through a capillary which may be the needle of the syringe, the plunger of which is continuously driven by a suitable variable-speed motor, into a complementary gas stream.

The volume fraction,  $\varphi_A$  of calibration component,  $A$ , in a mixture with complementary gas,  $B$ , is given by Equation (1):

$$\varphi_A = q_A / (q_A + q_B) \quad (1)$$