

**Gas analysis - Preparation of calibration gas mixtures using dynamic volumetric methods - Part 6: Critical orifices**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>Käesolev Eesti standard EVS-EN ISO 6145-6:2008 sisaldab Euroopa standardi EN ISO 6145-6:2008 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 20.08.2008.</p> <p>Standard on kättesaadav Eesti standardiorganisatsioonist.</p>	<p>This Estonian standard EVS-EN ISO 6145-6:2008 consists of the English text of the European standard EN ISO 6145-6:2008.</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 20.08.2008.</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 6: Critical orifices (ISO 6145-  
6:2003)

Analyse des gaz - Préparation des mélanges de gaz pour  
étalonnage à l'aide de méthodes volumétriques  
dynamiques - Partie 6: Orifices critiques (ISO 6145-6:2003)

Gasanalyse - Herstellung von Kalibriergasgemischen mit  
Hilfe von dynamisch-volumetrischen Verfahren - Teil 6:  
Kritische Düsen (ISO 6145-6:2003)

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

## Foreword

The text of ISO 6145-6:2003 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 6145-6:2008 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of an identical text or by endorsement, at the latest by February 2009, and conflicting national standards shall be withdrawn at the latest by February 2009.

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### Endorsement notice

The text of ISO 6145-6:2003 has been approved by CEN as a EN ISO 6145-6:2008 without any modification.

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## Introduction

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

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

## Part 6: Critical orifices

### 1 Scope

This part of ISO 6145 specifies a method for the continuous production of calibration gas mixtures, containing two or more components, from pure gases or other gas mixtures by use of critical orifice systems. By selection of appropriate combinations of orifices and with the use of pure gases, the volume fraction of the calibration component in the calibration gas mixture can be varied by a factor of  $10^4$ . Additionally, it can be changed by a factor of  $10^2$  by changing the initial pressures in the orifice systems. The uncertainty of the method depends mainly upon the flow calibration method and the variations in temperature and outlet pressure. The relative expanded uncertainty in the volume fraction obtainable for a binary mixture (at a coverage factor of 2) is 3 %.

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

The merits of the method are that multi-component mixtures can be prepared as readily as binary mixtures if the appropriate number of orifices is utilized, and that a large quantity of calibration gas mixture can be prepared on a continuous basis. The range of flow rates can be from several millilitres per minute to approximately 10 l/min.

Although particularly applicable to preparation of gas mixtures at barometric pressure, the method also provides a means of preparation of calibration gas mixtures at pressures above barometric pressure.

Annex B gives practical hints on the use of the method.

### 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

When passed through a critical orifice at increasing upstream pressure  $p_1$ , the volume flow rate of gas passing through the orifice will increase. When the ratio of the gas pressure upstream  $p_1$  and the gas pressure downstream of the orifice  $p_2$  has reached a critical value, on further increase of  $p_1$  the volume flow rate of the gas becomes independent with respect to  $p_2$ .