

ICS 71.040.40

CCS G 86



**NATIONAL STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**GB/T 5275.10-2009**

Replacing GB/T 5275-2005

---

**Gas analysis -- Preparation of calibration gas mixtures using  
dynamic volumetric methods -- Part 10: Permeation method**

气体分析 动态体积法制备校准用混合气体 第10部分：渗透法

**(English Translation)**

**Issued on: June 2, 2009**

**Implemented on: February 1, 2010**

---

**Issued by: Standardization Administration of China**

## Table of Contents

- Foreword
- 1 Scope
- 2 Normative references
- 4 Reagents and materials

### Foreword

GB/T 5275 "gas analysis dynamic volume Preparation of calibration gas mixtures" is expected to be divided into 11 parts.

- Part 1. Calibration;
- Part 2. positive displacement pump;
- Part 3 .( unavailable);
- Part 4. continuous injection;
- Part 5. Capillary calibration devices;
- Part 6. Critical orifices;
- Part 7. Thermal mass drive controller;
- Part 8. Diffusion method;
- Part 9. Saturation method;
- Part 10. Permeation;
- Part 11. Electrochemical method occurs.

This section GB/T 5275 Part 10.

This part identical with ISO 6145-10:2002 "gas analysis dynamic volume Preparation of calibration gas mixtures - Part 10. Infiltration Through Law. " this Part replaces GB/T 5275-2005 "gas analyzer calibration method for preparing a mixed permeate gas." the main difference compared to part with the GB/T 5275-2005 as follows.

- Increasing the reagents and materials requirements (Chapter 4 of this section);
- The "Application examples" (GB/T 35275-2005 of Cap) into "device" (Chapter 5 of this section), "Program" (this Part 6) two chapters were described in detail;
- Modify the calculation method (GB/T 5275-2005 4.2 This section 7.1);

- The "error" (GB/T 5275-2005 4.1) to "uncertainty" and increased uncertainties in the calculation of (in this section 7.3);
- Modify the sources of uncertainty (GB/T 5275-2005 4.1 This section 6.2);
- Increasing the sample calculation Uncertainty Double scale continuous weighing system as Appendix A (in this section in Appendix A).

This section of Appendix A normative appendix.

This part is proposed by the China Petroleum and Chemical Industry Association.

This part of the National Gas Standardization Technical Committee (SAC/TC206) centralized.

This section drafted by. China Institute of Metrology, Southwest Chemical Industry Research and Design Institute.

## 1 Scope

GB/T 5275 provisions of this part of the dynamic membrane permeation volume Preparation of calibration gas mixtures approach. In this way the system Calibration prepared by mixing the components of the gas mole fraction in the range of  $10^{-9}$  ~  $10^{-6}$ , the relative expanded uncertainty of 2.5%. Since this Within a range to maintain the kind of low-component calibration gas mixture remains solid content is difficult, so calibration gas mixtures to be used in temporary Preparation and delivery piping should be as short as possible. Calibration The technology has been in the preparation of a low level of gas mixtures such as air SO<sub>2</sub>, NO<sub>2</sub>, C<sub>2</sub>H<sub>6</sub> and other fields has been successfully applied.

When the carrier gas flow rate of gas mass flow measurement result by permeation control equipment calibration method of mixing the gas component is a dynamic volume Law and the law gives the content of component mole fraction form.

## 2 Normative references

The following documents contain provisions cited by GB/T 5275 to the present, constitute provisions of this section. For dated reference documents Member, all subsequent amendments (not including errata content) or revisions do not apply to this section, however, encouraged to reach under this section Parties to research agreement to use the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

ISO 6145-1 Gas analysis dynamic volume Preparation of calibration gas mixtures - Part 1. Calibration Principle 3 Calibration components such as SO<sub>2</sub>, NO<sub>2</sub>, ammonia (NH<sub>3</sub>), benzene, toluene, xylene permeation through appropriate into a carrier gas stream, i.e., to obtain the calibration mixed composition. The component known purity calibration gas

containing the permeate tube, the permeation tube is placed in a temperature-controlled container, with known traffic and subject to the control of the carrier gas purge this vessel. Content of the mixed gas by the flow rate of the constituent components of the gas permeability and high purity carrier gas to determine Given that the gas component and should not be and should not permeate tube of material from any chemical interference in the gas mixture to any other trace components by gas reaction.

Component calibration gas permeability through the membrane component depends on the nature of the material itself, the chemical properties of the membrane, structure, size, thickness, temperature Degree and component calibration gas permeable membrane through the partial pressure gradient. These factors can be kept constant by a suitable operation system.

The permeate tube was placed on a microbalance, through its continuously or periodically weighed, can be directly measured permeability.

## **4 Reagents and materials**

Osmoticum 4.1 for calibration should be chosen as high purity material as permeate, to avoid the effects of impurities on which the permeation rate; if not possible you should know Track the content and nature of impurities, and should consider the impact of these factors on permeability impurities.

### **4.2**

The carrier gas

Application of appropriate methods of analysis to determine its purity, for example, gas chromatography (GC) or Fourier Transform Infrared Spectroscopy (FTIR).

GB/T 5275.10-2009/ISO 6145-10:2002