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

GB/T 5275.11-2014

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

气体分析 动态体积法制备校准用混合气体 第11部分：电化学发生法

(English Translation)

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Foreword

GB/T 5275 "gas analysis dynamic volume Preparation of calibration gas mixtures" is divided into the following sections.

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

This section GB/T 5275 Part 11.

This section drafted in accordance with GB/T 1.1-2009 given rules.

This section uses the translation method identical with ISO 6145-11:2005 "gas analysis dynamic volume Preparation of calibration gas mixtures article Part 11. Electrochemical Method happen. " Consistency correspondence between this part of international documents and normative references of our files are as follows.

- GB/T 5275.1-2014 gas analysis equipment dynamic volume Method of calibration gas mixtures - Part 1. calibration method (ISO 6145-1:2003, IDT);
- GB/T 10628-2008 gas analysis calibration gas mixture composition measurements and

calibration comparison (ISO 6143:2001, IDT).

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 Limited.

1 Scope

GB/T 5275 provisions of this part of the component calibration gas mixture generated by electrochemical method and introduced into the carrier gas flow calibration preparation Methods. Changed by changing the gas flow rate through the electrolytic cell or to change the composition of the charge gas mixture. Calibration gas mixture content Relative expanded uncertainty U by the relative combined standard uncertainty multiplied by a coverage factor $k = 2$ obtained, its value is not more than 5%.

The preparation method for the preparation of multi-part predetermined volume fraction in the range of $0.1 \times 10^{-6} \sim 250 \times 10^{-6}$ calibration mixed gas.

Note 1: The gas generating electrochemical method available include oxygen (O_2), hydrogen (H_2), hydrogen cyanide (HCN), hydrogen sulfide (H_2S), chlorine (Cl_2), bromine (Br_2), dioxane Chloride (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 advantage of electrochemical law capable of producing stable calibration gas mixture quickly within a few minutes.

Note 3: The gas mixing system with an electrochemical gas generating device and a thermal mass flow controller, is equipped with computers and automatic control device, can be Commercial development. Examples See Appendix A.

2 Normative references

The following documents for the application of this document is essential. For dated references, only the dated version suitable for use herein Member. For undated references, the latest edition (including any amendments) applies to this document.

ISO 6143 Gas analysis calibration gas mixture composition measurements and check Comparative Law (Gasanalysis-Comparison methodsfordeterminingandcheckingthecompositionofcalibrationgasmixtures) ISO 6145-1 Gas analysis dynamic volume Preparation of calibration gas mixtures - Part 1. calibration method (Gasanalysis-Preparationofcalibrationgasmixturesusingdynamic volumetricmethods-Part 1. Methodsofcali-bration) GB/T 5275.7-2014 gas analysis dynamic volume Preparation of calibration gas mixtures - Part 7. Thermal mass flow controller Troller

(ISO 6145-7:2009, IDT)

3.1 Principle

The electrochemical method is the basic method of the occurrence of gas produced, the occurrence of electrochemical method, the calibration component is generated by an amount proportional to the amount of the charge, Faraday constant scale factor [1mol electrons (or single-charged ions) the amount of charge transferred] reciprocal equals Avogadro's number (NA) and the charge of an electron (-e) of the product.

$$F = NA \times e \quad (1)$$

Where.

F --- 96485.3415C/mol, the relative uncertainty of 4.0×10^{-8} (see reference [1], [2] and [3]).

Chapter 5 given as long as conditions are met, the exact determination of the amount of gas current can be determined by cell produced.