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

GB/T 5275.1-2024

Replacing GB/T 5275.1-2014

**Gas analysis - Preparation of calibration gas mixtures using
dynamic methods - Part 1: General aspects**

气体分析 动态法制备校准用混合气体 第1部分：通用要求

(English Translation)

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Table of Contents

Preface
Introduction
1 Scope
2 Normative references
3 Terms and Definitions
4 Symbols
5 Principle
6 Recommendations for using the dynamic preparation system
7 Calibration methods for dynamic preparation systems
8 Calculation of composition and its uncertainty
9 Sources of uncertainty and uncertainty of the final gas mixture
10 Verification
Appendix A (Normative) Detailed calculation method
Appendix B (Informative) Relative Atomic Mass and Molar Mass
Annex NA (Informative) Editorial changes made to ISO 6145-1:2019
Reference

Foreword

This document is in accordance with the provisions of GB/T 1.1-2020 "Guidelines for standardization work Part 1: Structure and drafting rules for standardization documents" Drafting is required.

This document is part 1 of GB/T 5275 "Preparation of calibration gas mixtures for dynamic volumetric analysis of gas".

The following parts have been published.

- Part 1: General requirements;
- Part 2: Piston pumps;
- Part 4: Continuous injection method;
- Part 5: Capillary calibrators;
- Part 6: Critical flow orifice;
- Part 7: Thermal mass flow controllers;

- Part 8: Diffusion method;
- Part 9: Saturation method;
- Part 10: Permeation method;
- Part 11: Electrochemical generation method.

This document replaces GB/T 5275.1-2014 "Preparation of calibration gas mixtures by dynamic volumetric method for gas analysis Part 1: Calibration Compared with GB/T 5275.1-2014, in addition to structural adjustments and editorial changes, the main technical changes are as follows.

- Changed the scope of application of the document and added an overview of the important technical contents of this document (see Chapter 1, 2014 edition chapter);
- Deleted the definition of "measurement uncertainty" and added the definitions of "mass flow rate" and "volume flow rate" (see Chapter 3, 2014 edition Chapter 3);
- Added a chapter on "Symbols" (see Chapter 4);
- Changed the introduction of the specific preparation method of the calibration gas mixture described in other parts of ISO 6145 (see Chapter 5, 2014 Chapter 4 and Chapter 5 of the 2011 edition);
- Added a summary table introducing the advantages and limitations of each dynamic method (see Table 1);
- Added recommendations for the use of dynamic preparation systems (see Chapter 6);
- The calibration method of the dynamic preparation system has been changed (see Chapter 7, 4.1 and 4.2 of the 2014 edition);
- Added the content requirements of the calibration certificate for dynamic preparation systems (see 7.4);
- Changed the calculation method of the composition of the mixed gas prepared by the dynamic method and its uncertainty (see Chapter 8, 4.2.1.2 of the 2014 edition, 4.2.2.2, 4.2.3.3, 4.2.7);
- Added relevant content on the composition verification method of mixed gas prepared by dynamic method (see Chapter 10);
- Deleted all contents related to measuring volume by weighing water capacity (see Appendix A of the 2014 edition);
- Deleted all contents related to the calibration of secondary instruments using reference instruments (see Appendix B of the 2014 edition);
- Added detailed calculation method for component molar fraction (see Appendix A).

This document is equivalent to ISO 6145-1:2019 "Preparation of calibration gas mixtures for dynamic gas analysis Part 1: General requirements" beg".

The following minimal editorial changes were made to this document.

--- Added Appendix NA (informative).

Introduction

The dynamic method is one of the important methods for preparing mixed gases for calibration. ISO has specially compiled the ISO 6145 series of standards for this purpose.

(ISO 6145-3 airflow intermittent injection method has been abolished).

GB/T 5275 (all parts) are equivalent to ISO 6145 series standards. Due to its length, ISO 6145 is divided into 11 parts.

GB/T 5275 is consistent with ISO 6145 and is also divided into 11 parts. Since ISO 6145-3 has been abolished, GB/T 5275 Part 3 of GB/T 5275 is also vacant accordingly. Part 1 of GB/T 5275 specifies the general requirements for the preparation of mixed gases for calibration by dynamic method;

He specifically described the principles, main equipment, and preparation precautions of nine methods for preparing mixed gases for calibration, such as the piston pump method, and stipulated the calculation of the volume fraction and mass fraction of the prepared mixed gas for calibration and the uncertainty evaluation are required to ensure that the prepared calibration gas meets the requirements.

Improve the quality of the mixed gas used for calibration and the preparation level of the mixed gas used for calibration.

GB/T 5275 (all parts) is intended for use by trained professionals with practical experience. GB/T 5275 consists of 10 parts.

Divided into components.

--- Part 1: General requirements. It specifies the basic information and applicability of each preparation method, precautions for operating the dynamic preparation system, the calibration method of the dynamic preparation system, the calculation and verification method of the content of each component of the mixed gas used for calibration and its uncertainty, etc.

The purpose of this part is to provide a basis for the rational selection of one or more mixed gas preparation methods for calibration.

The methods described in the other nine parts are linked to national measurement standards to ensure that the prepared gas mixture is Metrological traceability.

--- Part 2: Piston pump. The purpose is to provide a method for preparing a mixed gas for

calibration using a piston pump using two or more pure gases or mixed gases.

The method for determining the content of each component in the prepared calibration gas mixture and the uncertainty evaluation method are described.

--- Part 4: Continuous injection method. The purpose is to provide a method for continuously injecting a pure gas or a mixed gas into the balance gas through a syringe.

Method for continuously preparing a calibration mixed gas containing two or more components by using a calibration component, and the prepared calibration mixed gas Calculation method and uncertainty assessment method for the content of each component in the body.

--- Part 5: Capillary calibrators. The purpose is to provide equipment using built-in single or multiple capillaries to calibrate pure gases or mixed gases.

Method for continuously preparing mixed gas for calibration, and method for calculating the content of each component in the prepared mixed gas for calibration Method and uncertainty assessment method.

--- Part 6: Critical flow orifice. The purpose is to provide a method for preparing a calibration gas using a critical flow orifice with two or more pure gases or mixed gases.

Method using mixed gases, as well as calculation method and uncertainty evaluation of the content of each component in the prepared calibration mixed gas Way.

--- Part 7: Thermal mass flow controller. The purpose is to provide a thermal mass flow controller for pure gas or mixed gas Method for continuously preparing mixed gas for calibration, and method for calculating the content of each component in the prepared mixed gas for calibration and Uncertainty assessment method.

--- Part 8: Diffusion method. The purpose is to provide the use of diffusion method to prepare a calibration mixture made of two or more pure gases or mixed gases.

The method for preparing the mixed gas for calibration, as well as the calculation method and uncertainty assessment method of the content of each component in the prepared mixed gas for calibration.

--- Part 9: Saturation method. The purpose is to provide a method for continuously preparing a calibration mixture from more than one easily condensable gas using the saturation method.

The method for determining the content of each component in the prepared calibration gas mixture and the uncertainty evaluation method are described.

--- Part 10: Permeation method. The purpose is to provide a method for continuously preparing a calibration gas mixture from pure gas or mixed gas using the permeation method.