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

GB/T 38521-2025

Replacing GB/T 38521-2020

Gas analysis - Purity analysis and the treatment of purity data

气体分析 纯度分析和纯度数据的处理

(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document supersedes GB/T 38521-2020 "Gas Analysis - Purity Analysis and Processing of Purity Data" and is consistent with GB/T 38521-2020.

In comparison, aside from structural adjustments and editorial changes, the main technical changes are as follows.

---The content of "Purity Analysis with Traceable Results" has been revised, adding information on high-purity gas purity analysis with traceable results.

The analysis methods are given for high-purity gases, depending on whether the analyzer defines a zero point (see 6.2, 2020 edition).

---A "confidence interval" has been added, taking into account that when analyzing trace impurities, the lower bound of the normal distribution and the t-distribution is less than 0, which leads to the absence of a confidence interval.

To address the issue of efficiency, a method for calculating confidence intervals using the "beta" distribution is presented (see Chapter 8).

---Added "Certificates", providing methods and examples for setting up certificates when using the "beta" distribution (see Chapter 9).

This document is equivalent to ISO 19229:2019 "Gas analysis - purity analysis and processing of purity data".

The following minimal editorial changes have been made to this document.

---Corrected the error in the international standard [see equation (A.4)];

--- Added notes for "Analyzer with zero point defined" and "Analyzer without zero point defined" (see 6.2).

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Gas Standardization (SAC/TC206).

Introduction

Calculating the composition of calibration gas mixtures using purity data is a crucial method for establishing certified gas composition metrological traceability. Purity analysis.

This is typically very challenging because it is desirable to determine various trace components in the feed gas, but readily available measurement standards are not readily available.

Or it may not exist at all.

In many practical situations, purity data in different forms can be obtained. For the preparation of calibration gas mixtures, it is particularly important to ensure that this...

This purity information is presented in a uniform manner and applied to the calculation of the composition of mixed gases.

Gas analysis purity analysis and purity data processing

1 Scope

This document specifies the purity requirements for the raw materials used in the preparation of calibration gas mixtures, and describes the composition of the prepared gas mixtures.

Methods for obtaining and using purity data in calculations.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are not included.

For references to documents, only the version corresponding to that date applies to this document; for undated references, the latest version (including all amendments) applies.

This document.

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Note: Contents of GB/T 35860-2018 Certificate for Mixed Gases for Gas Analysis Calibration (ISO 6141:2015, IDT) ISO 6143 Gas analysis - Determination and calibration of gas mixtures - Comparative method for compositional content Note. GB/T 10628-2008 Gas analysis calibration - Determination and verification of the composition of gas mixtures (ISO 6143:2001, IDT) ISO 7504 Gas Analysis Vocabulary Note. GB/T 14850-2020 Glossary of Gas Analysis (ISO 7504:2015, IDT) ISO 12963 Gas analysis-Determination of composition of gas mixtures-Comparative method based on single-point and two-point calibration (Gasanalysis-Com-calibration) Note. GB/T 45133-2025 Gas analysis - Determination of composition of gas mixtures based on comparison of single-point and two-point calibrations (ISO 12963:2017).

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Note: GB/T 40870-2021 Conversion of gas mixture composition data for gas analysis (ISO 14912:2003, IDT) ISO/IEC Guide 98-3 Measurement Uncertainty Part 3: Guidelines for the Expression of Measurement Uncertainty (GUM-1995) (GUM.1995)] Note. GB/T 27418-2017 Evaluation and expression of measurement uncertainty (ISO/IEC Guide 98-3:2008, MOD)

3 Terms and Definitions

The terms and definitions defined in ISO 7504 apply to this document.

4 Symbols

The following symbols apply to this document.

- i. Components of the gas mixture