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Gas analysis — Purity analysis and the treatment of purity data

Analyse des gaz — Analyse de pureté et traitement des données de pureté

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 158, *Analysis of gases*.

This second edition cancels and replaces the first edition (ISO 19229:2015), which has been technically revised.

The main changes compared to the previous edition are as follows:

— the methods for traceable purity analysis have been elaborated;

— Clauses 8 and 9 have been added describing how to calculate coverage intervals and set up certificates, respectively;

— Annex A has been added with worked examples.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The use of purity data in the calculation of the composition of calibration gas mixtures is an essential element in establishing metrological traceability of the certified gas composition. Purity analysis is usually challenging as, normally, trace levels of various components should be determined in a matrix for which limited or no measurement standards are readily available.

In many practical situations, purity data in some form are available. For the preparation of calibration gas mixtures, it is important that this information is interpreted in a consistent fashion and taken into account in the calculation of the composition of the mixture.

Gas analysis — Purity analysis and the treatment of purity data

1 Scope

This document establishes the requirements for the purity analysis of materials used in the preparation of calibration gas mixtures and the use of these purity data in calculating the composition of the mixture thus prepared.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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/IEC Guide 98-3, *Uncertainty of measurement — Part 3: Guide to the expression of uncertainty in measurement (GUM:1995)*

ISO 6141, *Gas analysis — Contents of certificates for calibration gas mixtures*

ISO 6143, *Gas analysis — Comparison methods for determining and checking the composition of calibration gas mixtures*

ISO 7504, *Gas analysis — Vocabulary*

ISO 12963, *Gas analysis — Comparison methods for the determination of the composition of gas mixtures based on one- and two-point calibration*

ISO 14912, *Gas analysis — Conversion of gas mixture composition data*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 7504 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Symbols

In this document, the following symbols are used.

i running index over the components in a mixture

j index of the parent gas

k index of a specific component in a mixture

L_{ij} limit of detection of component i in parent gas j

u standard uncertainty (of the quantity between brackets)