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

GB/T 18403.1-2022

Replacing GB/T 18403.1-2001

Expression of performance of gas analyzers - Part 1: General

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Preface

Introduction

foreword

This document is drafted in accordance with the provisions of GB/T 1.1-2020 "Guidelines for Standardization Work Part 1. Structure and Drafting Rules for Standardization Documents".

This document is the first part of GB/T 18403 "Gas Analyzer Performance Indication". GB/T 18403 has published the following parts.

- Part 1. General;
- Part 2. Oxygen in gas (using high temperature electrochemical sensor);
- Part 3. Paramagnetic oxygen analyzer;
- Part 6. Photometric analyzer.

This document replaces GB/T 18403.1-2001 "Gas Analyzer Performance Representation Part 1. General Rules", and GB/T 18403.1-

Compared with 2001, except for structural adjustment and editorial changes, the main technical changes are as follows.

- Added the terms and definitions of span calibration gas (see 3.5.5);
- Deleted terms and definitions such as true value, agreed true value, and specified scope of work (see Chapter 3 of the 2001 edition);
- Change "error limit" to "uncertainty limit" (see 4.1, 4.4, 4.1, 4.4 of the 2001 edition);
- Change "inherent error limit" to "intrinsic uncertainty limit" (see 4.4.2, 4.4.1 of the 2001 edition);
- Change "linearity error" to "linearity uncertainty" (see 4.4.3.1, 4.4.2.1 of the 2001 edition);
- Change "interference error" to "interference uncertainty" (see 4.4.3.2, 4.4.2.2 of the 2001 edition);
- Added the calculation method of inherent uncertainty (see 5.6.2, 5.6.1 of the 2001 edition);

- Added the calculation method of "the maximum value of the standard deviation of each concentration input value as the repeatability value of the measurement" (see 5.6.4, 2001 version 5.6.3);
- Added the calculation diagram of output fluctuation (see 5.6.5, 5.6.4 of the 2001 edition);
- Changed the range of drift test, expanded from 50%~90% of the range to 50%~100% (see 5.6.6, 5.6.5 of the 2001 edition);
- Changed the range of lag time, rise time and fall time test, expanded from 70%~90% of full scale to 70%~100% (see 5.6.7, 5.6.6 of the 2001 edition);
- Changed the concentration range of the calibration gas fed in during the warm-up time measurement, expanding from 50%~90% of the full scale to 70%~100% (see 5.6.8, 5.6.7 of the 2001 edition);
- Changed the concentration range of the mixed gas in the interference uncertainty test, expanded from 70% to 90% of the range to 70% to 100% (see 5.6.9.2, 5.6.8.1 of the 2001 edition);
- Changed the calibration gas concentration range in the deviation test, expanded from 10% to 90% of the full scale to 0% to 100% (see 5.6.10.1, 5.6.9 of the 2001 edition);

This document identically adopts IEC 61207-1:2010 "Gas Analyzer Performance Representation Part 1. General Rules".

Please note that some contents of this document may refer to patents. The issuing agency of this document assumes no responsibility for identifying patents.

Introduction

Gas analyzer is a process analysis instrument for measuring gas composition, which is widely used in environmental monitoring and other fields. Gas analyzers are mainly based on

The principles of spectroscopy, chromatography, mass spectrometry, and electrochemistry measure the content of a certain substance in a gas. This document is the basic standard for the gas analyzer manufacturing industry.

It is the basis for the development, manufacture and testing of gas analyzers. Due to the different detection principles, GB/T 18403 "Performance Representation of Gas Analyzers" intends to

Consists of the following five parts.

--- Part 1.General. The aim is to specify general principles for the performance representation of gas analyzers for the real-time on-line determination of the composition of gas mixtures.

--- Part 2.Oxygen in gases (using high temperature electrochemical sensors). It is designed to stipulate the measurement of oxygen content in gas based on electrochemical sensors

Quantitative analyzer performance detection method.

--- Part 3.Paramagnetic oxygen analyzer. It is intended to specify the measurement of oxygen content in gases based on the high paramagnetic properties of oxygen in a magnetic field

The profiler's performance detection method.

--- Part 6.Photometric analyzer. A gas analyzer designed to specify the measurement of the content of individual components in a gas based on the photoresponse at different wavelengths

performance testing method.

--- Part 7.Tunable semiconductor laser gas analyzer. It aims to specify the measurement based on tunable semiconductor laser absorption spectroscopy technology

The performance detection method of the gas analyzer for measuring the content of each component in the gas.

Performance representation of gas analyzers - Part 1.General

1 Scope and purpose

This document applies to gas analyzers for the determination of the composition of gas mixtures.

This document specifies the terms, definitions, requirements and test methods for gas analyzers (hereinafter referred to as analyzers). Other parts of this series of standards

Parts, such as GB/T 18403.2, describe special types of analyzers using high-temperature electrochemical sensors.

This document is consistent with the provisions in GB/T 6592 and IEC 60770.

This document applies to analyzers that are permanently installed in any location (indoor or outdoor), as well as to sample handling systems and in-situ measurement techniques.

technical analyzer.

This document applies to a complete set of analyzers provided by the same manufacturer,

including all mechanical, electrical and electronic components of the analyzer.

The same applies to sensor units and electronics units from different manufacturers.

For the purposes of this document, any AC or DC regulated power supply supplied or specified by the manufacturer, whether or not connected to the analyzer

Installations are integrated and are considered part of the analyzer.

For safety requirements, refer to the relevant provisions of IEC 61010-1.

If one or more components of the sample are flammable and air or a gas mixture containing oxygen or other oxidizing components is present, then

Concentration ranges of reactive components are restricted outside the flammable range.

For the standard range of analog DC and pneumatic signals in process control systems, refer to the relevant provisions of IEC 60381-1 and IEC 60382.

For the method of selecting the test value of influence quantity, refer to the relevant regulations of IEC 60654.

Please refer to the relevant provisions of IEC 61187 for the file requirements of the analyzer.

See ISO 31-0 for general principles concerning quantities, units and symbols, and see ISO 1000.

This document does not apply to ancillary devices such as recorders, analog-to-digital converters or data acquisition systems used in conjunction with analyzers. But when two or

When more analyzers are combined and sold as a system, and only one electronic unit is provided to continuously measure several parameters, these readouts

The output components are considered to be part of the analyzer, and the EMF-current or EMF-voltage converters integrated with the analyzer also include

included.

Purpose of this document.

---Specify general terms and definitions related to the performance of analyzers for continuous measurement of gas composition;

--- Unify the methods used to manufacture and test the performance characteristics of such analyzers;

--- Specifies the tests and test methods required to determine the functional characteristics;

--- Provide basic information to support the application of ISO 9001 quality assurance standards.