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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 27894.3-2023

Replacing GB/T 27894.3-2011

Natural gas - Determination of composition and associated uncertainty by gas chromatography - Part 3: Precision and bias

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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:

This document is part 3 of GB/T 27894 "Determination of Composition and Calculation of Related Uncertainties of Natural Gas by Gas Chromatography":

GB/T 27894 has issued the following parts:

--- Part 1: General guidelines and composition calculations;

--- Part 2: Uncertainty calculation;

--- Part 3: Precision and bias;

--- Part 4: Determination of nitrogen, carbon dioxide and C1 to C5 and C6 with two chromatographic columns in the laboratory and on-line measurement system

hydrocarbons;

--- Part 5: Determination of nitrogen, carbon dioxide and C1 to C5 and C6 with three chromatographic columns in the laboratory and on-line process system

hydrocarbons;

--- Part 6: Determination of hydrogen, helium, oxygen, nitrogen, carbon dioxide and C1 to C8 hydrocarbons with three capillary chromatographic columns:

This document replaces GB/T 27894:3-2011 "Determination of Components of Natural Gas by Gas Chromatography under a Certain Uncertainty" Part 3

Part: Determination of Hydrogen, Helium, Oxygen, Nitrogen, Carbon Dioxide and Hydrocarbons up to C8 with Two Packed Columns", compared with GB/T 27894:3-2011, except

In addition to structural adjustments and editorial changes, the main technical changes are as follows:

a) The scope was changed to "quantitative determination of He, H2, O2, N2, CO2 and C1 to C8 hydrocarbons in natural gas with two packed columns":

"Phase chromatography" was changed to "the expected precision of gas chromatography established according to ISO 6974-1" (see Chapter 1,:2011 edition

Chapter 1);

b) The symbols of repeatability standard deviation and reproducibility standard deviation, etc: have been added (see Chapter 4);

c) The requirements for materials and equipment such as argon, helium, air, hydrogen, and working reference gases have been deleted (see the:2011 edition

Chapter 4, Chapter 5);

d) The principle has been changed, and the analysis method for determining the composition of natural gas by gas chromatography has been changed to the analysis result obtained by gas chromatography

Predictable precision (see Chapter 5, Chapter 3 of the:2011 edition);

e) The reference value for checking the precision of the normalized analysis results of each component is added, and the step of analyzing the content of natural gas components is deleted (see

Chapter 6, Chapter 6 of the:2011 edition);

f) Deleted the expression method and test report of the analysis results (see Chapter 7 and Chapter 8 of the:2011 edition);

g) Practical applications with increased precision (see Chapter 7);

h) The method of calculating the deviation has been added (see Chapter 8):

This document is equivalent to ISO 6974-3:2018 "Determination of Composition and Calculation of Uncertainties Related to Natural Gas by Gas Chromatography - Part 3

Subsection: Precision and Bias:

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

--- Added important tips;

--- ISO /IEC 17025 is deleted from the normative references in Chapter 2;

--- Added the note of Chapter 6;

--- Added ISO /IEC 17025 in the references:

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

GB/T 27894 provides natural gas analysis methods and methods for calculating component mole fractions and uncertainties, and is intended to be used for measuring H2, He,

O2, N2, CO2 and hydrocarbon components and component clusters, where component clusters are the heavy components above C5 that are uniformly measured as C6: The method works

Used in a variety of applications, such as determining calibration gas mixtures and natural gas composition, or providing uncertainty for calorific value calculations and other physical parameter calculations

data:

Currently, ISO 6974:4~ISO 6974:6 analytical method standards are proposed to be integrated into ISO 6974:4, and ISO 6974 is expected to be composed of 4 parts

become: Therefore, GB/T 27894 is proposed to consist of four parts:

--- Part 1: General guidelines and composition calculations: It is intended to give general guidelines for the analysis of natural gas by gas chromatography, as well as

Data processing methods for the determination of fractional mole fractions:

--- Part 2: Uncertainty calculation: It is intended to describe the procedure for calculating the uncertainty of the mole fractions of the individual components:

--- Part 3: Precision and bias: It is intended to describe the expected precision of a gas chromatographic method established in accordance with ISO 6974-1 to

and provide guidance on assessing deviations:

--- Part 4: Gas Analysis Guidelines: Designed to provide an overview of the analysis of natural gas and natural gas substitutes with Part 1, Part 2 and

When used in conjunction with Part 3, use gas chromatography to analyze samples for guidance on obtaining the best data:

Determination and Calculation of Natural Gas Composition by Gas Chromatography

Related Uncertainties Part 3: Precision and Bias

Important notice --- This document does not point out all possible safety issues, the user is responsible for taking appropriate safety and protection measures, and

Guarantee compliance with the conditions stipulated by relevant national laws and regulations:

1 Scope

This document describes the precision expected for gas chromatography established according to ISO 6974-1: When the method described in ISO 6974-1 shall

The precision values stated in this document provide the expected range of variation between test results when used in one or more competent laboratories:

This document also provides guidance on assessing bias:

2 Normative references

This document has no normative references:

3 Terms and Definitions

The following terms and definitions apply to this document:

3:1

Measurement precision measurementprecision

Under specified conditions, the degree of agreement between the indicated value or the measured value obtained by repeated measurement of the same or similar measured object:

Note 1: Measurement precision is usually expressed in numerical form by the degree of imprecision, such as standard deviation, variance or coefficient of variation under specified measurement conditions:

Note 2: "Prescribed conditions" can be repeatability measurement conditions, period precision measurement conditions or reproducibility measurement conditions (see ISO 5725-1):

Note 3: Measurement precision is used to define measurement repeatability, measurement precision during measurement and measurement reproducibility: