

ICS 75.060

CCS E 24



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

GB/T 46550.2-2025

**Natural gas - Determination of odorant - Part 2: Determination
of tetrahydrothiophene by electrochemical sensor**

天然气 加臭剂的测定 第2部分：用电化学传感器法测定四氢噻吩含量

Issued on: December 2, 2025

Implemented on: July 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This document conforms to GB/T 1.1-2020 "Standardization Work Guidelines Part

1.Structure and Drafting Rules of Standardization Documents". Drafting is scheduled. This document is Part 2 of GB/T 46550 "Determination of Odorants in Natural Gas". GB/T 46550 has been published with the following... part. --Part

1.Determination of tetrahydrothiophene and sulfur-free odorant content by photoionization gas chromatography; --Part

2.Determination of tetrahydrothiophene content using an electrochemical sensor method. 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 and is under the jurisdiction of the National Technical Committee

on Standardization of Natural Gas (SAC/TC 244). This document was drafted by: Beijing Gas Group Co., Ltd., and Southwest Oil & Gas Field Branch of China National Petroleum Corporation. Natural Gas Research Institute, Southwest Oil & Gas Field Branch of China National Petroleum Corporation, National Institute of Metrology, Sichuan Chuangang Gas Gas Limited Liability Company, Southwest Oil & Gas Field Branch of China National Petroleum Corporation Gas Branch, Sichuan Huayou Group Limited Liability Company Ren Company, Chongqing Gas Group Co., Ltd., Chengdu Nengte Technology Development Co., Ltd., Beijing Jinruipu Technology Co., Ltd., China Petroleum Natural Gas Sales Branch of Oil & Gas Co., Ltd., Dazhou Quality and Technical Supervision and Testing Center, Sichuan Zhongce Standard Technology Co., Ltd. Limited Liability Company, ENN (China) Gas Investment Co., Ltd. The main drafters of this document are. Zhou Li, Zhang Mingzuo, Wang Weijie, Zhang Pu, Xie Yu, Zhang Peiying, Wang Lin, Song Kejing, Shen Lin, Wang Kai, and Du Qiufang. Liu Siting, Lu Hongguang, Li Fuhua, Wang Xinwei, Wang Ke, Zhou Qingtian, Zheng Jie, Wang Jianlin, Zhu Hongyang, Liu Jinlan, Feng Lide, Wang Qingyuan, Zhou Xuesong Yang Jiawei, Yuan Jiaoyang, Liu Jianwei, Chen Xiaohua, Ren Xitong.

GB/T 46550, "Determination of Odorants for Natural Gas," specifies the principles, reagents and materials, instruments, and sampling procedures for determining odorants in town gas. Specific requirements regarding sample selection, testing procedures, data processing, and precision are beneficial for accurately determining the concentrations of tetrahydrothiophene and sulfur-free odorant in urban gas. Measurement facilitates the supervision and inspection of the content of warning gases in gas, or online detection, which is of great significance for ensuring urban gas safety. GB/T 46550 is proposed to consist of 3 parts. --Part

1.Determination of tetrahydrothiophene and sulfur-free odorant content by photoionization gas chromatography. The aim is to provide a photoionization method... An analytical method for determining the content of tetrahydrothiophene and sulfur-free odorant by gas chromatography with ionization can be used for online determination of odorant and in-situ analysis. Rapid field measurement. --Part

2.Determination of Tetrahydrothiophene Content Using an Electrochemical Sensor. The aim is to provide an electrochemical sensor for the determination of tetrahydrothiophene. The analytical method for thiophene content can be used for online and rapid on-site determination of odorants. --Part

3.Determination of Tetrahydrothiophene Content Using a Micro-thermal Conductivity Sensor. The aim is to provide a micro-thermal conductivity sensor for determining tetrahydrothiophene content. The analytical method for phenanthrene content can be used for online and rapid on-site determination of odorants. The electrochemical sensor method used in this document for determining tetrahydrothiophene content has advantages such as fast response speed and ease of operation, making it very suitable for... Online and rapid on-site determination of hydrothiophene. Determination of natural gas odorant Part

1 Scope

GB/T 46550.2-2025 is the Chinese national standard covering the field method for odorant - an electrochemical sensor instead of a chromatograph, which is what lets a distribution company check the odorant level at the far end of a network rather than only at the injection point. Part 2 of the series, first edition. It was issued on 2 December 2025 and has been in force since 1 July 2026, as a first edition. The document is under the responsibility of the Standardization Administration of China. This page is published from the official record of the 2025 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document describes the principle, reagents and materials, and instruments for determining the content of the odorant tetrahydrothiophene in natural gas using an electrochemical sensor method. Sampling, test procedures, data processing, precision and test reports. This document applies to the online and rapid on-site determination of tetrahydrothiophene content in natural gas, with a determination range of 1 mg/m³ to 50 mg/m³.

2 Normative references

The contents of the following documents, through normative references within the text, constitute essential provisions of this document. Dated citations are listed below. For references to this document, only the version corresponding to that date applies. For undated references, the latest version (including all amendments) applies. In this document.

GB/T 5274.1 Preparation of gas mixtures for gas analysis calibration - Part

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 electrochemical sensor A sensor that uses the electrochemical reaction being measured to convert its changes into changes in potential, current, or conductivity. [Source: GB/T 7665-2005, 3.1.26]

4.Principles Under certain pressure and flow rate conditions, the odorant tetrahydrothiophene in the sample gas diffuses to the sensitive electrode of the electrochemical sensor and undergoes oxidation. The reduction reaction generates a current signal that is proportional to the tetrahydrothiophene content, thereby obtaining the tetrahydrothiophene content in the sample gas.

5 Reagents and Materials

5.1 Midnight Air Nitrogen gas with a purity (volume fraction) of not less than 99.999%.

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