

ICS 75.060  
CCS E 24



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

**GB/T 43502.1-2023**

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**Natural gas-Determination of particulate matter-Part  
1:Determination of particle size distribution by optical method**

天然气 颗粒物的测定 第1部分：用光学法测定粒径分布

**Issued on: December 28, 2023**

**Implemented on: April 1, 2024**

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

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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 is Part 1 of GB/T 43502-2023 "Determination of Natural Gas Particulate Matter": GB/T 43502 has been released with Lower part:

- Part 1: Determination of particle size distribution by optical method:

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This document is proposed and coordinated by the National Natural Gas Standardization Technical Committee (SAC/TC244):

This document was drafted by: Gas Transmission Management Office of Southwest Oil and Gas Field Branch of China National Petroleum Corporation, China National Petroleum Corporation Southwest Oil and Gas Field Branch of China National Petroleum Corporation, Gathering and Transportation Engineering Technology Research Institute, Southwest Oil and Gas Field Branch of China National Petroleum Corporation Natural Gas Research Institute, China National Petroleum Corporation Tarim Oilfield Branch, China National

Petroleum Corporation North China Oil Tian Branch, National Pipeline Group United Pipeline Co., Ltd: West-East Gas Transmission Branch, China University of Petroleum (Beijing):

The main drafters of this document: An Jianchuan, Zheng Sijia, Zhang Weizhi, Dai Zhixiang, Cheng Hua, Hu Jian, Li Ming, Chen Jingdong, Bie Qin, Tu Zhenquan, Mei Yonggui, Zhang Yao, Ji Zhongli, Liu Zhen, Luo Min, Wang Xiaoqiang, Wu Yan, Chen Yongzhi, Zhang Jinghui, Liu Zhe, Zhang Di, Li Xiaohong, Zhang Peiying, and Tu Menggele:

## Introduction

Natural gas contains a certain amount of particulate matter, and the presence of particulate matter affects the transportation and utilization of natural gas: From filtration separation, equipment corrosion From the perspective of corrosion and pipeline blockage, particulate matter content, particle size and composition are important temperament indicators of natural gas:

The purpose of measuring particulate matter:

- Monitor the temperament entering long-distance pipelines;
- Evaluate the dust removal efficiency of filtration and separation equipment:

GB/T 43502 "Determination of Natural Gas Particulate Matter" aims to describe the determination of the particle size and compound composition of flowing particulate matter in natural gas:

The method of composition and content is planned to consist of the following three parts:

- Part 1: Determination of particle size distribution by optical method: The purpose is to determine the particle size and distribution of flowing particulate matter in natural gas:
- Part 2: Determination of composition by spectroscopic method: The purpose is to determine the compound composition and elemental distribution of flowing particulate matter in natural gas:
- Part 3: Determination of content by weighing method: The purpose is to determine the content of mobile particulate matter in natural gas:

Determination of natural gas particulate matter Part 1: Determination of particle size distribution by optical methods

## 1 Scope

This document describes methods for determining the size and distribution of particulate matter in natural gas using laser diffraction and optical particle counting, including Reagents and materials, instruments and equipment, measurement procedures, data

processing, precision and measurement reports:

This document is applicable to the measurement of particle size and distribution in metering systems and filtration separation systems of natural gas transmission and distribution stations: Laser diffraction measurement The fixed range is 0.1μm~100μm, and the measuring range of optical particle counting method is 0.1μm~60μm:

## 2 Normative reference documents

GB/T 6682

GB/T 19077

GB/T 20604

GB/T 20801

GB/T 27893

JJF1190

JJF1211

## 3 Terms and definitions

The terms and definitions defined in GB/T 20604 and the following apply to this document:  
3:1 isokinetic sampling isokinetic sampling A sampling method in which the gas velocity entering the sampling probe hole is equal to the average gas velocity at that location in the pipe: [Source:SY/T 6892-2012,3:4]

## 4 Principles

4:1 Laser diffraction method During the propagation process, the laser is interfered by the particles in the sample, causing diffraction in space: According to Fraunhofer diffraction theory, the intensity of the diffracted light The degree and spatial distribution show a certain functional relationship with the particle size of the measured particles, that is, a single spherical particle with a diameter of  $d$  has a certain functional relationship with the light intensity on the transformation surface:

The relationship can be expressed by formula (1) and formula (2):  $d = 2.2\lambda / \sin \theta$  nm (1)