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

GB/T 11060.3-2018

Replacing GB/T 11060.3-2010

**Natural gas Determination of sulfur compound Part
3: Determination of hydrogen sulfide content by lead acetate
reaction rate dual photo path method**

天然气含硫化合物的测定 第3部分：用乙酸铅反应速率双光路检测法测定硫化氢含量

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Foreword

GB/T 11060 "Determination of sulfur compounds in natural gas" is divided into the following 12 parts.

- Part 1. Determination of hydrogen sulfide content by iodometric method;
 - Part 2. Determination of hydrogen sulfide content by methylene blue method;
 - Part 3. Determination of hydrogen sulfide content by lead light stripping rate double light path detection method;
 - Part 4. Determination of total sulfur content by oxidation microcoulometry;
 - Part 5. Determination of total sulfur content by hydrogenolysis-rate meter colorimetry.
 - Part 6. Determination of hydrogen sulfide, mercaptan sulfur and sulfur oxides by potentiometry;
 - Part 7. Determination of total sulfur content by Ringerna combustion method 1); 1) Part 7 of GB/T 11060 has been discontinued.
 - Part 8. Determination of total sulfur content by ultraviolet fluorescence spectrophotometry;
 - Part 9. Determination of thiol sulfur content by iodometric method;
 - Part 10. Determination of sulfur compounds by gas chromatography;
 - Part 11. Determination of hydrogen sulfide content by the color length test tube method;
 - Part 12. Determination of hydrogen sulfide content by laser absorption spectroscopy.
- This part is the third part of GB/T 11060. This part is drafted in accordance with the rules

given in GB/T 1.1-2009. This part replaces GB/T 11060.3-2010 "Determination of sulfur compounds in natural gas - Part 3. Determination of hydrogen sulfide content by optical path detection method. Compared with GB/T 11060.3-2010, the main technical changes except editorial changes are as follows:

---In the scope chapter, added "applicable to landfill gas, sewage treatment gas, recycle gas, combustion gas and fuel gas mixture Determination of hydrogen sulfide (H₂S) content. Can also be used to determine the hydrogen sulfide content of carbon dioxide" (see Chapter 1);

1 Scope

GB/T 11060.3-2018 is the Chinese national standard on natural gas determination of sulfur compound part 3: determination of hydrogen sulfide content by lead acetate reaction rate dual photo path method, in the field of petroleum and related technologies. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 17 September 2018 by the State Administration for Market Regulation; Standardization Administration of China, and has been in force since 1 April 2019. Classification: ICS 75.060, CCS E24. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

This part of GB/T 11060 specifies the test method for the determination of hydrogen sulfide in natural gas by the lead acetate reaction rate method. This section applies to the determination of hydrogen sulfide (H₂S) content in natural gas. The measurement range is 0.1×10^{-6} ~ 16×10^{-6} (phi), which is about equivalent. It is from

0.1 mg/m^3 to 22 mg/m^3 ; and the measurement range can be extended to a higher concentration by dilution. This section also applies to liquefied petroleum gas (LPG), natural gas substitutes, landfill gas, sewage treatment gas, recycle gas, combustion gas and Determination of hydrogen sulfide content in a fuel gas mixture. It can also be used to determine the hydrogen sulfide content in carbon dioxide. This section does not cover all security issues related to its application. Before using this section, the user is responsible for setting the appropriate security and Protection measures and clarify the scope of their limitations.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only dated versions apply to this article. Pieces. For undated references, the

latest edition (including all amendments) applies to this document.

GB/T 6682 Analytical laboratory water specifications and test methods

GB/T 13609 Natural Gas Sampling Guidelines

3 Principle of the method

After the gas sample is humidified at a constant flow rate, it flows through the lead acetate paper strip, and hydrogen sulfide reacts with lead acetate to form lead sulfide, which produces brown on the paper strip. Black spots. The rate of reaction and the rate of color change produced are proportional to the concentration of hydrogen sulfide in the sample. Photodetector detection reaction The black spot of lead sulfide is formed, and the generated voltage signal is processed by the first derivative to obtain a response value, which is passed through with the known hydrogen sulfide standard gas. The value of hydrogen sulfide in the sample is determined by comparison.

4 Reagents and materials

Warning - Hydrogen sulfide in compressed gas cylinders is flammable, harmful or fatal to humans after inhalation and ingestion. Compressed air should be handled in a well ventilated position Bottle and away from sparks and open flames. Improper handling of compressed gas cylinders filled with air, nitrogen or hydrocarbons can cause an explosion. Rapid release of nitrogen or hydrocarbon It can cause suffocation and compressed air to support combustion.

4.1 Acetic acid solution (5%). A volume of glacial acetic acid was mixed with 19 volumes of distilled water to prepare a 5% acetic acid solution. Distilled water should meet Technical requirements for secondary water as specified in GB/T 6682.

4.2 Nitrogen. The purity is not less than 99.99% (phi).

4.3 Hydrogen sulfide standard gas. hydrogen sulfide standard gas in methane or nitrogen, or hydrogen sulfide of the same or similar type as the gas to be analyzed. Standard gas, national secondary gas reference material. Bottled standard gas pressure reducing valves should be suitable for sulfur-containing gases, and their joints should be passivated with sulfur-containing gases. Or inert.