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

GB/T 11060.5-2010

Replacing GB/T 19207-2003

**Natural gas -- Determination of sulfur compound -- Part 5:
Determination of total sulfur content by hydrogenolysis and
rateometry colorimetry method**

天然气 含硫化合物的测定 第5部分：用氢解-速率计比色法测定总硫含量

(English Translation)

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Foreword

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

- Part 1. Determination of hydrogen sulfide content by iodometry;
- Part 2. Determination of hydrogen sulfide content with methylene blue method;
- Part 3. Determination of lead acetate reaction rate of hydrogen sulfide content of the double optical path method;
- Part 4. Determination of total sulfur content by oxidation Microcoulometry;
- Part 5. Hydrogen Solutions - rate meter colorimetric determination of total sulfur content.

This section GB/T 11060 Part 5.

This part of GB/T 19207-2003 "Natural gas - Determination of total sulfur in the solution of hydrogen - rate meter method" of amendments. due to GB/T 19207-2003 modify using ASTM D4468-85 (2000) Standard Test Method for Hydrogen Solutions' total sulfur in gaseous fuel - speed Meter method ", and ASTM D4468-1995 has been revised to ASTM D4468-85 (2006), so this part of the revised adoption ASTM D4468-85 (2006) "Standard Test Method for Total Sulfur gaseous fuel Hydrogen Solutions - rate meter method" (in English).

For ease of comparison, listed in Appendix A of this section and the control list ASTM D4468-85 (2006) standard terms and conditions.

This portion ASTM D4468-85 (2006) The main differences are.

- The name of this section by the "Standard Test Method for Total hydrogenolysis gaseous fuel sulfur - rate meter method" to "sulfur gas Solutions of test compound with hydrogen - rate meter colorimetric determination of total sulfur content ";
- Chapter 1 of the original standard "measurement range (volume fraction ϕ) $0.001 \times 10^{-6} \sim 20 \times 10^{-6}$," changed to "measurement range $0.1 \times 10^{-6} \sim 20 \times 10^{-6}$ (ϕ), equivalent

to about 0.1mg/m³ ~ 26mg/m³ ";

--- Original standard units of measurement are instead of legal units of measurement;

--- ASTM D4468-85 (2006) cited in the relevant foreign standards, the references are made part of the standard of the corresponding current standard;

--- In order to be consistent with our current "standard reference gas measurement conditions" and other relevant standards, this section ASTM D 4468-85 (2006) volume fraction of sulfur compounds "at 25 °C, 101.3kPa under" in terms of concentration change of formula "In the 20 °C, 101.3kPa down" in terms of mass concentration formula. And an increase in the volume fraction of sulfur compounds in terms of total Sulfur content (mg/m³) of the formula;

--- Original standard precision made editorial changes. Of refined natural gas containing hydrogen sulfide and sulfur compounds containing no hydrogen sulfide when Density list will be described.

This Part replaces GB/T 19207-2003 "Determination of Hydrogen Solutions for natural gas in the total sulfur - count rate colorimetry." this portion of the GB/T 19207-2003 main differences are.

--- To be consistent with the series of standards, change the standard name;

--- Chapter 1 of the original standard "measurement range (volume fraction phi) 0.001 x 10⁻⁶ ~ 20 x 10⁻⁶," changed to "measurement range 0.1 x 10⁻⁶ ~ 20 x 10⁻⁶ (phi), equivalent to about 0.1mg/m³ ~ 26mg/m³ ";

--- Original standard "flow rate" to "flow";

--- Original standard "carbonyl sulfide" to "carbon monoxide sulfur";

--- Original standard 6.2 "sulfur-containing compound represents the reference standard volume fraction" with a volume fraction "reference standard Sulfur Compounds number";

--- Original standard precision made editorial modifications. The original standard "in natural gas and hydrogen sulfide sulfur compounds not only when hydrogen sulfide is precision "to" precision gas sulfur compounds "containing hydrogen sulfide and hydrogen sulfide-free time.

Appendix A of this section is an informative annex.

This part of the National Standardization Technical Committee proposed natural gas.

This part of the National Standardization Technical Committee centralized natural gas.

This section is drafted. Daqing Oilfield Engineering Limited, Southwest Oil and Gas Field Branch Gas Research Institute.

1 Scope

This section provides the solution with hydrogen - Test methods for natural gas in the total sulfur content rate meter colorimetry.

This section applies to the determination of total sulfur content of natural gas, the measurement range of $0.1 \times 10^{-6} \sim 20 \times 10^{-6}$ (phi), equivalent to about $0.1\text{mg/m}^3 \sim 26\text{mg/m}^3$; and measurement range can be extended to higher concentrations by dilution. This part can be used as refined products such as Propane, butane, ethane, ethylene quality control analysis means.

This section does not address all the safety issues related to its application. Before using this section, the user has the responsibility to develop appropriate safety and Health measures, and clarify the scope of its qualified.

2 Normative references

The following documents contain provisions which, through reference GB/T 11060 in this section constitute provisions of this section. For dated reference documents Member, all subsequent amendments (not including errata content) or revisions do not apply to this section, however, encouraged to reach under this section Parties to research agreement to use the latest versions of these documents. For undated reference documents, the latest versions apply to this section.

GB/T 6682 analytical laboratory use specifications and test methods (GB/T 6682-2008, ISO 3696. 1987, MOD)

3 Test principle

The sample at a constant rate into the flow of hydrogen within the hydrogen analyzer solution at a temperature of $1000\text{ }^{\circ}\text{C}$ or more sample and hydrogen gas is pyrolysis, sulfur Compounds are converted to hydrogen sulfide (H_2S). The reaction of hydrogen sulfide with lead acetate results read by a colorimetric reaction rate meter detection unit 10^{-6} (Phi).

4 Reagents and materials

4.1

Detection tape. Use appropriate size of lead acid impregnated filter paper analysis.

4.2

acetic acid (5%). The volume of water to 1 volume of glacial acetic acid is mixed with the 19 formulated as a 5% solution of acetic acid. Distilled water should be consistent with GB/T 6682 regulations Given two water technical requirements.

4.3

airtight syringe. 0.1mL and 0.5mL airtight syringe each one for the preparation of calibration standards. Volume measuring syringe Accuracy of 1% or higher.

4.4

equipped with a piston pump. 10L polypropylene cylinder, the cylinder has a freely movable piston with a silicone rubber "-" on the piston Ring, this ring need to use silicone lubricant lubrication. This tube is used by volume formulation (10-6, phi) or the reference standard samples.

4.5

sulfur carbon dioxide (COS). volume fraction of 99% of the COS standards vials, the bottle outlet connected with a needle valve. In the needle valve About 60cm polyethylene pipe connection, when the pipeline purged with COS, insert airtight syringe out of pure COS from the standard vial, this Operation should be carried out in a fume hood or in well-ventilated areas. In taking adequate odor control measures can also use other sulfur compounds Thereof. If each molecule of sulfur compounds containing two sulfur atoms, the sample volume can be reduced by half.

4.6

Hydrogen. the volume fraction of not less than 99.99% of the sulfur-free hydrogen.

Note: When mixed with air, hydrogen has a very wide explosive limit.