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DL

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

DL/T 920-2019

**Determination of air, carbon tetrafluoride, hexafluoroethane and
perfluoropropane content in sulphur hexafluoride by gas
chromatography method**

六氟化硫气体中空气、四氟化碳、六氟乙烷和八氟丙烷的测定 气相色谱法
(English Translation)

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Table of Contents

Foreword
1 Scope
2 Principle
3 Apparatus and materials
4 Analysis steps
5 Result calculation

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009 "Guidelines for Standardization Work Part 1: Standard Structure and Compilation".

This standard replaces DL/T 920-2005 "Gas Chromatography Method for Determination of Air and Carbon Tetrafluoride in Sulfur Hexafluoride Gas", and DL/T 920-2005 in comparison, the main revisions are as follows.

--Modified the standard name.

--Expanded the scope of application of this standard.

-Added the measurement of hexafluoroethane and octafluoropropane components in sulfur hexafluoride gas.

Please note that certain contents of this document may involve patents. The issuing agency of this document is not responsible for identifying these patents.

This standard was proposed by the China Electricity Council.

This standard is under the jurisdiction of the National Electrochemical Standardization Technical Committee (TC322).

The organization responsible for drafting this standard. State Grid Jiangsu Electric Power Co., Ltd. Electric Power Research Institute, State Grid Shandong Electric Power Company Electric Power Research Institute Research Institute, State Grid Anhui Electric Power Research Institute, State Grid Fujian Electric Power Research Institute, State Grid Tianjin Electric Power Research Institute, State Grid Hubei Electric Power Co., Ltd. Electric Power Research Institute, State Grid Chongqing Electric Power Co., Ltd.

Electric Power Research Institute, Wuhan World Engineering Technology Co., Ltd., Shandong Zhonghui Instrument Co., Ltd.

1 Scope

This standard specifies the gas chromatography method for the determination of air, carbon tetrafluoride, hexafluoroethane and octafluoropropane in sulfur hexafluoride gas.

This standard applies to the content of air (N₂, O₂), carbon tetrafluoride, hexafluoroethane and octafluoropropane in sulfur hexafluoride gas used in electrical equipment Determination.

2 Principle

This method uses a gas chromatograph to completely separate air, carbon tetrafluoride, hexafluoroethane, octafluoropropane and sulfur hexafluoride, and its concentration can be Determine from their peak area (or peak height) and the absolute correction factor of the test compound to the detector.

3.1 Chromatograph

Gas chromatograph with thermal conductivity and hydrogen flame detector.

3.2 Recording device

It is advisable to use a chromatographic workstation or a chromatographic data processor, an integrator, and a range of (0~1) mV and a response time of 1s.

A recorder with a recording paper width of 250mm.

3.3 Carrier gas

Helium (or hydrogen) with a purity of not less than 99.99%.

3.4 Column

The resolution of the detected components should meet the requirements of quantitative analysis. A typical chromatographic column has an inner diameter of 2mm and a length of 6m. 60 meshes filled with 1m~ 80 mesh silica gel, 5m 60 mesh ~ 80 mesh Porapak Q.

Before using the new separation column, the carrier gas should be ventilated at 120°C for at least 4 hours. The measuring device is shown in Figure 1.

Figure 1 Schematic diagram of air, carbon tetrafluoride, hexafluoroethane and octafluoropropane measuring equipment

3.5 Standard gas

The mixed gas containing all tested components shall be inspected and used within the validity period. The mass fraction of each component should be in GB/T 12022 Between 50% and 300% of the concentration limit of the measured gas component.

3.6 Instrument gas flow process

See Table 1 for examples of common gas path processes.

Table 1 Examples of common gas path processes

4.1.1 Gas chromatograph

Keep the instrument in a stable standby state and select appropriate chromatographic conditions (typical chromatographic conditions are. column temperature 40°C, carrier gas flow rate 35mL/min, bridge current 160mA).

4.1.2 Instrument calibration

Under the same chromatographic conditions as the analytical sample, inject 1.0 mL of standard gas into the chromatographic column and perform parallel determinations at least twice until the phase the difference between the two adjacent measurement results is not more than 20% of the average of the measurement results, whichever is the average.

4.2.1 Quantitative collection of sample gas

Turn the sulfur hexafluoride sample cylinder upside down (to take a liquid sample) and connect it to the inlet of the gas sampling valve. Open the sample steel one by one the bottle valve and the rotating six-way valve connect the sulfur hexafluoride sample gas to the quantitative loop, flush the 1mL quantitative loop and pipeline with the sample gas for 3~5 minutes, and take the sample the air and residual gas in the loop are purged out, and then the six-way valve is rotated to close the sampling tube and the sulfur hexafluoride sample cylinder valve is closed.

4.2.2 Sample analysis

Under stable working conditions of the chromatograph, rotate the six-way valve to connect the carrier gas to the quantitative loop, and quickly pass through the separation column and detector for separation.

For separation detection, record the peak area (or peak height) of each different component, and then turn the six-way valve to the sampling position.

5 Result calculation

5.1

The mass fraction of each component in the sample gas