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

GB/T 31058-2026

Replacing GB/T 31058-2014

Electronic gas - Silicon tetrafluoride

电子气体 四氟化硅

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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 replaces GB/T 31058-2014 "Gasical Silicon Tetrafluoride for Electronic Industry". Compared with GB/T 31058-2014, except for the following. Aside from structural adjustments and editorial changes, the main technical changes are as follows:

- a) The scope has been changed (see Chapter 1, Chapter 1 of the.2014 edition);
- b) The technical requirements for silicon tetrafluoride have been revised (see Chapter 4, Chapter 3 of the.2014 edition);
- c) The sampling requirements have been changed (see Chapter 5, 4.1.3 of the.2014 edition);
- d) The method for calculating purity has been changed (see 6.1, 4.2 of the.2014 edition);
- e) The methods for determining the content of hydrogen, oxygen, argon, nitrogen, carbon monoxide, carbon dioxide, and methane have been revised (see 6.2, 4.3 of the.2014 edition);
- f) The methods for determining the content of hydrogen sulfide and sulfur dioxide have been changed (see 6.3,

4.4 of the 2014 edition);

g) A method for determining hydrogen fluoride content has been added (see 6.4);

h) Added methods for determining the content of metallic elements and other elements (see 6.5);

6.1 Purity of silicon tetrafluoride

6.1.1 Total impurity content The total impurity content is calculated according to formula (1).

6.1.2 Purity The purity of silicon tetrafluoride is calculated according to formula (2).

6.2 Determination of the contents of hydrogen, oxygen, argon, nitrogen, carbon monoxide, carbon dioxide, and methane

6.2.1 Determination Method The contents of hydrogen, oxygen, argon, nitrogen, carbon monoxide, carbon dioxide, and methane in silicon tetrafluoride were determined according to the method specified in GB/T 28726. (The following is a list of methods/applicants.) The determination shall be made using other equivalent methods. In case of any dispute over the determination results, the method specified in GB/T 28726 shall be the arbitration method.

6.2.2 Pre-separation column

6.2.2.1 Pre-separation column I. A stainless steel tube 0.6m long and 2mm inner diameter, filled with carbon molecular sieves with a particle size of 0.18mm~0.25mm. Or other equivalent pre-separation columns.

6.2.2.2 Pre-separation column II. A 4m long stainless steel tube with an inner diameter of 2mm, filled with polymer particles with a particle size of 0.18mm~0.25mm. (ethyl styrene and divinylbenzene copolymer), or other equivalent pre-separation columns.

6.2.3 Chromatographic column

6.2.3.1 Chromatographic column I. 1.5m long, 3mm inner diameter 316L stainless steel tube, packed with 5A fractions with a particle size of 0.18mm~0.25mm. A sieve, or other equivalent chromatographic column. This column is used to determine the content of hydrogen, oxygen, argon, nitrogen, carbon monoxide, and methane.

6.2.3.2 Column II. A capillary column, 30 m long,

0.32 mm inner diameter, lined with a copolymer of ethyl styrene and divinylbenzene, or other similar materials. High-efficiency chromatographic column. This column is used to determine the carbon dioxide content.

6.2.4 Standard Samples The component content (mole fraction) in the standard sample should preferably be 1×10^{-6} to 5×10^{-6} , and the balance gas should be high-purity helium,

conforming to GB/T 4844. Regulation.

6.2.5 Referenced Gas Flow Diagram The reference gas path flow diagram is shown in Appendix A.

6.3 Determination of hydrogen sulfide and sulfur dioxide content Perform the test according to GB/T 28727. Other equivalent methods may be used for determination; in case of any disagreement regarding the test results, GB/T 28727 shall prevail. The prescribed method is arbitration.

6.4 Determination of Hydrogen Fluoride Content

6.4.1 Measurement Method The hydrogen fluoride content in silicon tetrafluoride should be determined according to the method specified in GB/T 46384.1. Other equivalent methods may also be used. When measuring... In case of disagreement regarding the determination result, the method specified in GB/T 46384.1 shall be the arbitration method.

6.4.2 Measurement conditions The reference measurement conditions are as follows:

---Characteristic peak wavenumber of hydrogen fluoride. 4034cm^{-1} ~ 4043cm^{-1} .

---Resolution. 0.5cm^{-1} ~ 5cm^{-1} .

---Ambient temperature. 18°C ~ 25°C .

---Ambient relative humidity. $\leq 60\%$.

---Other measurement conditions shall be performed in accordance with the instrument instruction manual.

6.4.3 Standard Samples When determining the hydrogen fluoride content in silicon tetrafluoride, it is advisable to have three gaseous standard samples with different component contents, the hydrogen fluoride contents of which are approximately. 1×10^{-6} (mole fraction), 2×10^{-6} (mole fraction), 5×10^{-6} (mole fraction), the balance gas is high-purity helium, and should conform to GB/T 4844. Regulation.

6.5 Determination of the content of metallic elements and other elements Perform in accordance with the provisions of GB/T 34972.

6.6 Exhaust Gas Treatment During the measurement, exhaust gas treatment measures should be in place to prevent silicon tetrafluoride from polluting the environment.

7 Inspection Rules

7.1 Silicon tetrafluoride produced continuously and stably on the same production line constitutes a batch.

7.2 The numerical values of the measurement results shall be rounded and the limit values shall be determined in accordance with the rounding comparison method specified in GB/T

8170.

7.3 The content of hydrogen fluoride and metal elements shall be tested by random sampling according to the sampling quantity specified in Table

2. When the test results meet the requirements of Table 1... If the test results are satisfactory, the batch of products is deemed (qualified). If the test results do not meet the requirements of Table 1, double the random sampling should be performed again from the same batch of products for testing. If the test results meet the requirements of Table 1, then the batch of products is considered (qualified) except for the non-compliant bottle; if the test results still do not meet the requirements of Table 1... If the regulations are not met, the batch of products will be deemed unqualified.

8.1 Marking

8.1.1 Silicon tetrafluoride shall be accompanied by a product quality certificate upon leaving the factory, the contents of which shall include at least.

---Product name, manufacturer's name, hazardous chemical production license number;

---Production date or batch number, and shelf life;

---Fill weight (kg);

---This document number and the purity of silicon tetrafluoride.

8.1.2 The packaging container should be marked with the words "Electronic Gas Silicon Tetrafluoride".

8.1.3 The packaging markings for silicon tetrafluoride shall comply with the provisions of GB 190, the color markings shall comply with the provisions of GB/T 7144, and the labels shall comply with... The provisions of GB 15258 and GB/T 16804.

8.2 Packaging, Transportation and Storage

8.2.1 Gas cylinders containing silicon tetrafluoride shall comply with the provisions of GB/T 5099 (all parts) or GB/T 33145.

8.2.2 The filling and storage of silicon tetrafluoride shall comply with the provisions of GB/T 14193.1 and TSG

23. The safety management regulations for filling and storage are as follows: Regulations on the Safety Management of Hazardous Chemicals and Regulations on the Safety Supervision of Special Equipment.

8.2.3 Gas cylinders with internal surface treatment should be used, and the treated cylinders should comply with the provisions of this document. The connection method of the cylinder valve outlet should preferably be... Use CGADISS642 or CGA330.