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

GB/T 5828-2025

Replacing GB/T 5828-2006

Pure xenon, high purity xenon and ultra pure xenon

纯氙、高纯氙和超纯氙

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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 5828-2006 "Xenon". Compared with GB/T 5828-2006, apart from structural adjustments and editorial changes, the main differences are as follows.

The technological changes are as follows.

- Content related to the uses, properties, molecular formula, and relative molecular weight of xenon has been removed from the scope (see Chapter 1, 2006 edition). Chapter 1);
- The line about grading has been deleted, a requirement for 99 9999% purity xenon has been added, a requirement for total impurity content has been added, and some other changes have been made.

Limits for impurity content (see Chapter 4, Chapter 3 of the 2006 edition);

- The requirements for xenon gas sampling and sampling safety have been changed (see Chapter 5, 4.1.2 of the 2006 edition);
- The method for calculating xenon purity has been changed (see 6.1, 4.2 in the 2006 edition);
- The method for determining the hydrogen content in xenon gas has been changed (see 6.2, 4.4 of the 2006 edition);
- The methods for determining the carbon monoxide, carbon dioxide, and methane content in xenon gas have been revised (see 6.2, 4.5 of the 2006 edition);
- The method for determining moisture content has been changed (see 6.3, 4.6 in the 2006 edition);

- Requirements for exhaust gas treatment have been added (see 6.4);
- The requirements of the inspection rules have been changed, and provisions for rounding off numerical values have been added (see 7.1);
- Added labeling requirements (see 8.2);
- Added requirements for accompanying documents (see 8.3);
- The regulations for packaging, filling, transportation, and storage have been changed, and requirements for liquid xenon have been added (see Chapter 9, 2006 edition). Chapter 5);
- Added safety information for xenon (see Chapter 10);
- The section on determining the content of nitrogen, oxygen, argon, krypton, nitrous oxide, and fluoride in xenon using helium ionization gas chromatography has been removed.

For a detailed description of the specific determination method, please refer to Appendix A of the 2006 edition.

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Petroleum and Chemical Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Gas Standardization (SAC/TC206).

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The release history of this document and the document it replaces is as follows.

- First published in 1986 as GB/T 5828-1986 "Pure Xenon";
- First revised in 1995 as GB/T 5828-1995 "Xenon", and incorporated into GB/T 5830-1986 "Testing of Pure Krypton and Pure Xenon".

The content of the "Methods" (GB/T 5830-1986 was the first publication);

- Revised for the second time in 2006 as GB/T 5828-2006 "Xenon";
- This is the third revision.

1 Scope

This document specifies the technical requirements for pure xenon, high-purity xenon, and ultra-pure xenon, as well as sampling, inspection rules, marking, labeling, accompanying documents, and packaging.

The requirements for filling, transporting, and storing xenon are described, along with relevant test methods and safety information.

This document applies to pure xenon, high-purity xenon, and ultra-pure xenon prepared by cryogenic separation and purification from air.

2 Normative references

GB/T 150

GB 190

GB/T 191

GB/T 4844

GB/T 4946

GB/T 5099

GB/T 5832.1

GB/T 5832.2

GB/T 5832.3

GB/T 5832.4

GB 6388

GB/T 7144

GB/T 8170

GB/T 11640

GB/T 14193

GB/T 14850

GB 15258

GB/T 16483

GB/T 16804

GB/T 24159

GB/T 28054

GB/T 28726

GB/T 30685

GB/T 34525

GB/T 43306

3 Terms and Definitions

The terms and definitions defined in GB/T 4946 and GB/T 14850 apply to this document.

4 Technical Requirements

The technical requirements for pure xenon and high-purity xenon shall comply with the provisions of Table 1.

Table 1 Technical Requirements project index Pure xenon, high-purity xenon, ultra-pure xenon Xenon (Xe) purity (mole fraction). $\geq 99.99\%$ $\geq 99.995\%$ $\geq 99.999\%$ $\geq 99.9995\%$ $\geq 99.9999\%$ Nitrogen (N₂) content (mole fraction). $\leq 20 \times 10^{-6}$, $\leq 9 \times 10^{-6}$, $\leq 2.5 \times 10^{-6}$, $\leq 1.5 \times 10^{-6}$, $\leq 0.2 \times 10^{-6}$ [Oxygen (O₂) Argon (Ar)] content (mole fraction) $\leq 5 \times 10^{-6}$ $\leq 4 \times 10^{-6}$ $\leq 1.5 \times 10^{-6}$ $\leq 0.5 \times 10^{-6}$ $\leq 0.2 \times 10^{-6}$ Hydrogen (H₂) content (mole fraction). $\leq 2 \times 10^{-6}$ $\leq 1 \times 10^{-6}$ $\leq 0.5 \times 10^{-6}$ $\leq 0.5 \times 10^{-6}$ $\leq 0.1 \times 10^{-6}$ Carbon monoxide (CO) content (mole fraction). $\leq 1 \times 10^{-6}$, $\leq 0.4 \times 10^{-6}$, $\leq 0.2 \times 10^{-6}$, $\leq 0.1 \times 10^{-6}$, $\leq 0.05 \times 10^{-6}$ Carbon dioxide (CO₂) content (mole fraction). $\leq 1 \times 10^{-6}$, $\leq 0.8 \times 10^{-6}$, $\leq 0.3 \times 10^{-6}$, $\leq 0.1 \times 10^{-6}$, $\leq 0.05 \times 10^{-6}$ Methane (CH₄) content (mole fraction). $\leq 1 \times 10^{-6}$, $\leq 0.8 \times 10^{-6}$, $\leq 0.3 \times 10^{-6}$, $\leq 0.1 \times 10^{-6}$, $\leq 0.05 \times 10^{-6}$ Moisture (H₂O) content (mole fraction) $\leq 3 \times 10^{-6}$ $\leq 3 \times 10^{-6}$ $\leq 2 \times 10^{-6}$ $\leq 1 \times 10^{-6}$ $\leq 0.1 \times 10^{-6}$ Krypton (Kr) content (mole fraction) $\leq 50 \times 10^{-6}$ $\leq 20 \times 10^{-6}$ $\leq 2 \times 10^{-6}$ $\leq 1 \times 10^{-6}$ $\leq 0.15 \times 10^{-6}$ Nitrous oxide (N₂O) content (mole fraction). $\leq 2 \times 10^{-6}$, $\leq 1 \times 10^{-6}$, $\leq 0.2 \times 10^{-6}$, $\leq 0.1 \times 10^{-6}$, $\leq 0.05 \times 10^{-6}$ Fluoride content [as shown by hexafluoroethane] [C₂F₆ Content Meter] (Mole Fraction) $\leq 15 \times 10^{-6}$ $\leq 10 \times 10^{-6}$ $\leq 0.5 \times 10^{-6}$ $\leq 0.1 \times 10^{-6}$ $\leq 0.05 \times 10^{-6}$ Total impurity content (mole fraction) $\leq 100 \times 10^{-6}$ $\leq 50 \times 10^{-6}$ $\leq 10 \times 10^{-6}$ $\leq 5 \times 10^{-6}$ $\leq 1 \times 10^{-6}$